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Diabetes mellitus type two in Stockholm County, Sweden: examining ethnicity as an independent risk factor—a cross-sectional study

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Abstract

Background: Diabetes mellitus type two (T2DM) is a major global health issue. It is caused by an interaction between genetic and environmental factors. It is a metabolic disorder characterised by elevated blood glucose which can lead to serious health complications. Global prevalence is expected to increase, reaching nearly 600 million cases by 2033. It carries massive disease and economic burden, especially in low to middle income countries. Global studies on different ethnic groups have revealed that ethnicity can increase or decrease the risk of developing T2DM.

Aim: Our aim is to shed light on ethnicity as an independent risk factor for T2DM by analysing population data from Stockholm County, Sweden where 20 per cent of individuals are foreign born and T2DM is a growing public health concern.

Methods: We used cross-sectional data from the Stockholm Public Health Survey 2010 (n=71,972) combined with information from national registries. We approximated ethnicity by country of birth (COB) which was then grouped into nine geographical categories. Established risk factors include age, gender, body mass index (BMI), education level, diet, tobacco, alcohol, physical activity and sedentary behaviour, which were adjusted for. First, we explored the prevalence of T2DM by COB group. Second, we conducted a univariate analysis to determine the significance of the selected risk factors and T2DM. Third, by logistic regression, we analysed the risk for T2DM by COB group compared to Swedish-born individuals adjusting for all significant risk factors from the univariate analysis. Then, we stratified our data set by COB group, and introduced all significant risk factors to explore differences in magnitude.

Results: Prevalence of T2DM was highest in the North Africa and the Middle East group (8.4 per cent). Relative to Swedish-born individuals, COB was a risk factor for T2DM in the Sub-Saharan Africa (OR 2.34), North Africa and the Middle East (OR 2.32) and Asia (OR 3.14) groups when all other risk factors were adjusted for. All studied risk factors were statistically significant for T2DM except fish consumption and snus use. Age, BMI and gender were the most consistent risk factors across groups in the stratified models. We found that moderate to high alcohol consumption appeared to reduce risk for T2DM considerably.

Conclusion: Ethnicity is an independent risk factor for T2DM. Prevalence differs across ethnic groups. Not all established risk factors affect ethnic groups in the same way. The results can inform future prevention and management programmes.

Key words: diabetes mellitus, diabetes type two, ethnicity, country of birth, Sweden, global

Contents

List of abbreviations

BMI-body mass index

CI-confidence interval

COB-country of birth

IDF-International Diabetes Federation

LMIC-low to middle income country

MET-metabolic equivalent of task

OR-odds ratio

PR-prevalence ratio

SC-Stockholm County

SPHS-Stockholm Public Health Survey

T2DM-type 2 diabetes mellitus

1. Introduction

1.1 Overview

What is T2DM?

T2DM is a complex disease caused by both genetic and environmental factors. (1) It is a metabolic disorder characterised by hyperglycaemia resulting from problems with insulin secretion and insulin action. It occurs when pancreatic beta cells can no longer produce sufficient insulin to match the insulin resistance caused by obesity and other lifestyle related factors. This leads to elevated blood glucose within the body which can result in serious health complications involving the cardiovascular system, kidneys, eyes and peripheral nerves. (2)

Why is it a problem?

T2DM is a rapidly growing epidemic. (2) It is a major contributor to the global burden of disease, and an increasing health problem intimately linked to rising obesity rates and health-behaviours like poor dietary habits and low physical activity. (2, 3) According to the International Diabetes Federation (IDF) prevalence will increase worldwide, from 8.3 per cent in 2013 to 11 per cent by 2033 with the number of those affected increasing from 382 to nearly 600 million. (4) Incidence is highest in the Western Pacific region of the world where between 2012 and 2013, 6 million cases were diagnosed. (5) India and China are thought to have the highest prevalence with 65 and 98 million cases, respectively. (1) In Europe, approximately 8 per cent of the population are affected. (1) The disease has many grave implications—aside from being a major threat to human health it carries a massive global economic burden. In 2014 the IDF estimated that total global diabetes expenditure was USD 612 billion, comprising 10 to 15 per cent of total health care cost in developed countries alone. (4, 6) With such significant disease and economic burden, T2DM requires urgent action.

What are the risk factors?

Known risk factors include age, gender, BMI, family history, high waist circumference and health-related behaviours such as tobacco use, low physical activity levels, sedentary time, and poor dietary habits. (7, 8) Those above the age of forty, with a high waist circumference, a diet high in refined carbohydrates and low in fibre, and who are physically inactive have an increased risk because these factors can lead to impaired glucose tolerance, a precursor to T2DM. (4, 7) Recent literature suggests there is a need to go upstream in the

causal chain and examine areas such as socioeconomic position as well as biogeographical factors such as COB and ancestry. (9, 10)

Ethnicity as a risk factor

Ethnicity has been defined as 'a complex multi-dimensional construct reflecting the confluence of biological factors and geographical origins, culture, economic, political and legal factors, as well as racism'. (11) We chose to examine it using COB information as this was available from registries in Sweden.

It is an important risk factor to be considered when planning prevention strategies and for disease management. (12) There is a need to understand individual susceptibility by way of ethnicity in combination with established risk factors. (5) To exemplify, a study from 2014 examining native and non-native citizens in Sweden found that groups with Middle Eastern ethnicity had a greater risk for T2DM even when adjusting for a number of established risk factors. (12) As well, Lopez et al. (13) reported that those with African and Hispanic ethnicity had a significantly higher risk of developing T2DM due to specific genetic loci. Furthermore, Admiraal (14) stated that individuals of South Asian and African origin had an increased risk of developing T2DM when compared to those of European descent because of genetic differences. Wong (15) highlighted that despite lower overall BMI people of Asian descent were at increased risk compared to Europeans. Overall, these findings demonstrate that ethnicity plays a role in the onset of T2DM—a finding also confirmed by Wandell et al. who reported that genetic sensitivity coupled with lifestyle factors leads to onset. (16) The role of ethnicity in relation to other risk factors still requires further investigation because its magnitude is not yet fully understood and the potential for prevention through health-related behaviours should be explored. (17)

Genetics

We acknowledge the integral role of genetics as part of the framework of this research area. As such, a brief discussion of genes will be useful for our study because its fundamental role when examining diabetes risk and ethnicity cannot be overlooked.

The underlying role of genetics is attributable to 'energy-saving thrifty genotypes'. (1) These genes were thought to have been beneficial for individuals, who lived at times where food was scarce, and developed as an evolutionary mechanism for survival. As

such, they continue to be part of our genetic make-up, but have become problematic in a society with increasingly energy-dense diet and sedentary lifestyle. (1)

One gene of particular importance is TCF7L2. It has been strongly associated with the development of T2DM in African, Asian, and certain European populations. (1) A global meta-analysis investigating the association between the TCF7L2 gene and risk for T2DM in different ethnic groups highlighted that its increased presence in certain groups was associated with increased risk. (18) Based on defined population groups, ethnicities were identified as being vulnerable to T2DM. For Northern Europeans, it was Danes, for Other Caucasian it was Americans, for Asian it was Japanese and for Africans it was North Africans. (18) This example illustrates that differences in risk for T2DM by ethnicity are in part explained by genetics. It should be noted that there are many other genes involved in diabetes onset as well, such as CAPN10 and KCJN11.

Prevention and treatment for T2DM

Lifestyle interventions which address changes in diet and promote physical activity and exercise are key components for the prevention and management of T2DM. (19) A recent meta-analysis examining treatment strategies concluded that multi-pronged lifestyle interventions which include smoking cessation, behaviour modification, exercise, diet and counselling were most effective. (19) The Finnish Diabetes Prevention Study is critical to mention when discussing diabetes prevention. It was the first individually randomised, controlled clinical trial in this area. (20) It followed individuals with a high risk for diabetes over four years while implementing an intensive lifestyle intervention aimed at reducing weight, modifying diet, and increasing physical activity. It found that a 60 per cent reduction in risk could be archived through intensive dietary and physical activity counselling alone. (20) In fact, the decreased risk had a residual benefit, which lasted up to 13 years in some cases. For treatment, a review study confirmed that pharmacological interventions are highly effective and even more so when combined with lifestyle interventions for reducing progression of the disease. (7)

1.2 Background

The Stockholm County

In SC approximately 20 per cent of the adult population are foreign-born. (21) A study from 2007 showed that individuals born outside of Europe, like South America or the

Middle East had a two to three times higher risk of developing T2DM than those who were Swedish-born. (22) For individuals from Asia this risk was four times higher compared to Swedish-born individuals. In SC, overweight and obesity are increasing, and currently are at an all-time high. (23) Prevalence of T2DM is approximately 5.4 per cent corresponding to approximately 73,000 known cases. (21) 3 per cent of women and 5 per cent of men have the disease. (21) Diabetes is a growing public health concern in SC.

Figure 1: Map of Northern Europe showing geographical location of study setting, Stockholm County, Sweden denoted by the red star

Global health relevance

This project has global health relevance because T2DM is a health threat making up 2 per cent of the global disease burden. (3) The burden is expected to increase, with the majority of it falling on the shoulders of low to middle income countries (LMIC). (17) For our study, the data comes from the Stockholm Public Health Survey (SPHS) 2010, a

comprehensive public health survey used to provide information on the determinants of health and consequences of the burden of disease in the area. (24) The data is considered robust and has been used by the international research community to generate insight into global health issues. (24) This study will contribute to the understanding of the risk for T2DM associated with ethnicity which could be generalized to the LMIC setting and provide insight for prevention efforts.

3. Research question

Does ethnicity play a role as an independent risk factor for T2DM?

4. Aim and specific objectives

Aim

To understand the role of ethnicity as an independent risk factor for T2DM

Objectives

1) To describe differences in the prevalence of T2DM in different ethnic groups
2) To investigate COB as a risk factor independent of behavioural and other established risk factors
3) To describe differences in behavioural and established risk factors in different ethnic groups
4) To describe the magnitude of risk factors for T2DM in different ethnic groups

5. Materials and methodology

5.1 Study Setting: SC is an urban region with a population of approximately 2.1 million people, one-fifth of the total Swedish population. (21)

5.2 Study design: This was a quantitative study. A cross-sectional analysis was performed based on the results of the SPHS 2010. All data had been previously collected by Stockholm County Council. The data was obtained from an entrusted data manager. The selected risk factors for our analysis were age, gender, education level, smoking, snus, alcohol consumption, physical activity, sedentary behaviour and dietary habits. All selected risk factors were

possible to examine because of the breadth and multi-disciplinary coverage of the survey. Some of the data was already cleaned up from previous use; and various questions from the survey had been validated previously through use in different studies. For our use, missing values were kept as missing. Variables were coded and classified as outlined below.

5.3 Materials: All data came from the SPHS 2010 and Statistics Sweden. The survey covers health, demographic, socioeconomic and lifestyle factors. (21) (Annex 4)

5.4 Sampling strategy and sample: All participants were randomly selected from SC, between the ages of 18-84 years and identified from the Swedish Total Population register at Statistics Sweden. (24) SC has 39 municipalities and districts; each municipality was equally represented in the sample, with approximately 1300 individuals coming from each. (24) The sample size was n=71,972.

5.5 Variable definitions

Predictor

Ethnicity*:* For our study, the main exposure was ethnicity. We have approximated ethnicity by COB information provided by Statistics Sweden through linkages with each respondent's personal identification number. (25) COB was categorised into 1 of 28 groups which were based on the proportion of response rates by individuals originating from specific areas of the world. This grouping was done by the Stockholm County Council. (22) The rational for it was that since respondents came from many different countries, it was necessary to group individuals from countries with little immigration to Sweden in order to analyse them. We further categorised respondents into 1 of 9 groups based on geography which we used for our analysis (Annexes 1, 2 and 3). When comparing COB groups, Sweden was used as the reference category. We did not include the North America group in the stratified portion of analysis as there were too few respondents.

Outcome

Diabetes: The outcome variable was T2DM. To assess diabetes, the survey asks the participant: 'Have you been diagnosed by a doctor as having diabetes?". The type was not specified, however they were asked to indicate at what age they were diagnosed. By diagnosis age we were able to make an informed interpretation whether they had type 1 or type 2 diabetes, as the latter usually manifests itself later in life while the former is early on. (26, 27) For

people who reported diagnosis of diabetes before 20 years of age we considered them as not having T2DM, as they were most likely to have type 1, and excluded them from the analysis.

Risk factors

The risk factors were both categorical and continuous. The reference category for each variable was chosen by identifying the most 'positive' or healthy category (e.g. not smoking, healthy intake of vegetables and fruit and so on).

Age: Self-reported on the questionnaire was the age in years when the survey was completed. It was used as a continuous variable, and also grouped into categories previously established by the SPHS which were 18-29, 30-44, 45-64, and 65-84. Those above the age of 84 were excluded as they have their own questionnaire.

Gender: Self- reported.

Body Mass Index (kg/m^2): Self-reported information on height and weight was used to compute BMI. It was used as a continuous and categorical variable. We categorised it as: normal weight (<25), overweight (25-29.9) and obese (≥30). (28) We excluded BMI values above 50 kg/m^2 as they were likely an error in self-reporting.

Physical activity and sedentary behaviour: were assessed by questions measuring physical activity at work, at home doing domestic chores, sedentary time, walking or cycling, and exercising on average, per week. These questions were formulated to be able to estimate metabolic equivalent of task (MET). (29) We assigned a MET value for each category and calculated 'MET minutes per week'. We then ranked the sample into tertiles, 'low', 'medium' and 'high' and used these categories for the analysis.

***Dietary habits*:** were determined through questions about the average frequency of consumption of foods on a daily, weekly or monthly period over the previous 12 month period. The questions provided a reasonable picture of healthy and unhealthy eating habits and a crude frequency estimation of consumption of major food groups for the sample. (30) We converted the responses to frequency per week or per day depending on the food type which we then categorised as (0) unhealthy or (1) healthy, based on cut offs (Table 1). (31) The food categories were vegetables, fruit, sweets (chocolate, cakes, and cookies), fish, processed meat, and sugary drinks.

Table 1: Cut-offs for frequency of food type consumption on a daily or weekly basis

Food type	Unhealthy	Healthy
Vegetables	≤1 time per day	≥2 times per day
Fruit	≤1 time per day	≥2 times per day
Fish	≤1 time per week	≥2 times per week
Processed Meat	≥2 times per week	≤1 time per week
Sweets	≥3 times per week	≤2 times per week
Sugary Drinks	≥2 times per week	≤1 time per week

Tobacco usage

***Smoking*:** Information on past and current smoking was used to classify subjects as (1) never a smoker (2) former smoker and (3) currently a smoker.

Snus: Information on past and current snus (moist snuff) was used to classify subjects as (1) never a snus user (2) former snus user and (3) currently using snus.

***Alcohol consumption*:** Based on type and weekly frequency grams per day was calculated. (32) Our data set already included a variable in grams per day. We categorised alcohol intake based on recommendations for daily consumption from the National Board of Health and Welfare along with information from a study similar to ours into 'no alcohol', 'low', 'medium' and 'high'. (23, 33) For males, cut-offs were: 'no alcohol (0), 'low' (<10.99g/day), 'medium' (≥10.99 and <22.56g/day) and 'high' (≥22.56g/day). For females, it was 'no alcohol' (0), 'low' (<6g/day), 'medium' (≥6 and <13.97g/day) and 'high' (≥13.97g/day).

***Education level*:** was self-reported as one of five different groups which were then collapsed into three categories: (1) post-secondary or more (2) 2-3 years of secondary school (3) Up to nine years of primary school.

5.6 Statistical analysis

The statistical analysis was divided into two parts, descriptive and analytical. For the descriptive part, we started by indicating the number of respondents (n) for each variable and its categories, as well as the proportion it made up of the whole sample (%) (Table 2). This was repeated for the respondents with T2DM (Table 2). Following this, we calculated the prevalence of T2DM for each COB group followed by the prevalence ratio (PR) com-

pared to Sweden (Table 3). In order to explore if there was a significant difference between the COB groups we used a chi-square test.

For the analytical part, we began with a univariate analysis. We used binary logistic regression to test the relationship between each risk factor and T2DM (Table 4). This was repeated adjusting for non-modifiable risk factors—age, gender, and education level. This was done to be able to compare our results to other similar studies. Next, to explore COB as an independent risk factor, we created a model with COB and T2DM, and adjusted for all significant risk factors from the univariate analysis (Table 5). Then, we stratified our data set by COB. We did a descriptive analysis of each COB group (Table 6). Then we introduced all significant risk factors into each COB model (Table 7). This allowed us to see which risk factors had a statistically significant impact on T2DM risk for each COB group and how magnitude differed.

Statistical significance was determined by an OR and p-value of ≤ 0.05. For each section of the analysis we noted the OR from the beta coefficient while providing the 95 per cent confidence interval (CI). We denoted statistical significant with an asterisk (*).

5.7 Statistical software All data was analysed using IBM SPSS Statistics version 22.

5.8 Data collection

All data came from the 2010 SPHS. Further information had been collected on respondents, such as COB, from registries with Statistics Sweden. (24) Data collection was managed by Statistics Sweden along with researchers based at Stockholm County Council and Karolinska Institutet. The 2010 questionnaire was more web-based than previous versions allowing participants to complete the questionnaire on-line, while others were given a postal questionnaire. In 2006 the questionnaire was translated into Arabic, Finnish, Turkish, Farsi, English and Spanish to reduce non-response within the immigrant population, thus the 2010 would have been available in these languages. The response rate for 2010 was approximately 60 per cent. (24)

5.9 Ethical considerations

Permission for use of this data was granted by the Stockholm Regional Ethical Review Board.

6. Results

6.1 General characteristics

Prevalence of T2DM was 5.4 per cent (n=3,891). Diabetics were older in comparison to the whole sample, with the majority between the ages of 65-84 (58.3 per cent) compared to 45-64 (38.6 per cent) (Table 2). Of all the diabetics, there were more men (58.8 per cent) than females (41.2 per cent). Diabetics had a higher BMI with 76.6 per cent in the overweight and obese categories, combined, compared to 47.1 per cent for the sample as a whole. They were less educated, as only 27.1 per cent had 'post-secondary or more' compared to 44.1 per cent for the sample. More diabetics smoked (12.5 per cent) or had formally smoked (44.6 per cent) compared to 11.2 per cent and 33.6 per cent for the sample, respectively. They drank less alcohol, with 29.9 per cent in the 'no alcohol' group compared to 17.9 per cent. Overall, diet among diabetics was similar to the sample as a whole. The number of those with unhealthy consumption patterns of vegetables, fruit and fish did not vary considerably. However, diabetics had a greater proportion of respondents with unhealthy consumption of processed meat (21.7 per cent) compared to the sample (16 per cent). For sweets and sugary drinks, diabetics had a greater proportion of respondents in the 'healthy' category compared to the entire sample—52.8 per cent compared to 37 per cent for sweets and 87.8 per cent compared to 78.7 per cent for sugary drinks.

Table 2: Description of the study sample				
Variable	*Total (n=71,972)*	*(%)*	*Diabetes-Yes (n=3,891)*	*(%)*
COB group				
Sweden	60,004	(83.4)	3,033	(77.9)
Nordic	3,816	(5.3)	286	(7.4)
Eastern Europe	2,335	(3.2)	159	(4.1)
Western and Southern Europe	1,396	(1.9)	92	(2.4)
North America	219	(0.3)	9	(0.2)
Latin America	827	(1.1)	47	(1.2)
Sub-Saharan Africa	563	(0.8)	42	(1.1)
North Africa and the Middle East	1,857	(2.6)	154	(4.0)
Asia	943	(1.3)	69	(1.8)
Age (Mean 52.4, S.D 16.2)				
18-29	6,571	(9.1)	26	(0.7)
30-44	18,048	(25.1)	158	(4.1)
45-64	27,766	(38.6)	1,439	(37.0)
65-84	19,587	(27.2)	2,268	(58.3)
Gender				
Women	40,237	(55.9)	1,604	(41.2)
Men	31,735	(44.1)	2,287	(58.8)
BMI (Mean 25.3, S.D 4.3)				
Normal Weight	37,009	(52.9)	869	(23.4)
Overweight	24,541	(35.1)	1,560	(42.0)
Obese	8,429	(12.0)	1,286	(34.6)
Education Level				
Post-secondary or more	31,459	(44.1)	1,041	(27.1)
2-3 years of secondary school	28,888	(40.5)	1,766	(46.0)
Up to 9 years of primary school	10,966	(15.4)	1,035	(26.9)
Smoking				
Never	38,977	(55.2)	1,617	(42.9)
Former	23,738	(33.6)	1,684	(44.6)
Current	7,945	(11.2)	472	(12.5)

Variable	*Total (n=71,972)*	*(%)*	*Diabetes-Yes (n=3,891)*	*(%)*
Snus				
Never	60,356	(83.9)	3,270	(84.1)
Former	5,399	(7.5)	314	(8.1)
Current	6,211	(8.6)	306	(7.9)
Daily Alcohol Consumption				
No Alcohol	12,856	(17.9)	1,162	(29.9)
Low	16,305	(22.7)	944	(24.3)
Medium	21,909	(30.4)	883	(22.7)
High	20,902	(29.0)	902	(23.2)
Physical activity: MET mins per wk				
High	22,928	(33.3)	1,289	(35.8)
Medium	22,978	(33.3)	1,158	(32.2)
Low	22,946	(33.3)	1,151	(32.0)
Diet Indicators				
Vegetables				
Healthy	19,265	(28.0)	832	(23.5)
Unhealthy	49,617	(72.0)	2,703	(76.5)
Fruit				
Healthy	19,901	(28.8)	1,058	(29.6)
Unhealthy	49,295	(71.2)	2,513	(70.4)
Fish				
Healthy	35,716	(51.4)	1,913	(53.0)
Unhealthy	33,837	(48.6)	1,695	(47.0)
Processed meat				
Healthy	57,876	(84.0)	2,785	(78.3)
Unhealthy	11,053	(16.0)	771	(21.7)
Sweets				
Healthy	26,000	(37.0)	1,926	(52.8)
Unhealthy	44,181	(63.0)	1,719	(47.2)
Sugary Drinks				
Healthy	54,392	(78.7)	3,079	(87.8)
Unhealthy	14,753	(21.3)	429	(12.2)

6.2 T2DM prevalence by COB group

To address the first aim of the study we calculated the prevalence of T2DM by COB group and the prevalence ratio (PR) compared to Sweden (Table 3). Prevalence was highest in the North Africa and the Middle East group (8.4 per cent) and lowest in the North America group (4.1 per cent). There was statistical significance in the difference between the groups according to a chi-square test.

Table 3: Prevalence and Prevalence Ratio (PR) of T2DM by country of birth group

Country of birth group	Diabetes-Yes (n=3,891)	Prevalence (%)	PR
Sweden	3,033	5.1	Ref
Nordic	286	7.6	1.49
Eastern Europe	159	6.9	1.35
Western and Southern Europe	92	6.7	1.31
North America	9	4.1	0.80
Latin America	47	5.7	1.12
Sub-Saharan Africa	42	7.6	1.49
North Africa and the Middle East	154	8.4	1.65
Asia	69	7.4	1.45

Chi-square significance ≤0.001

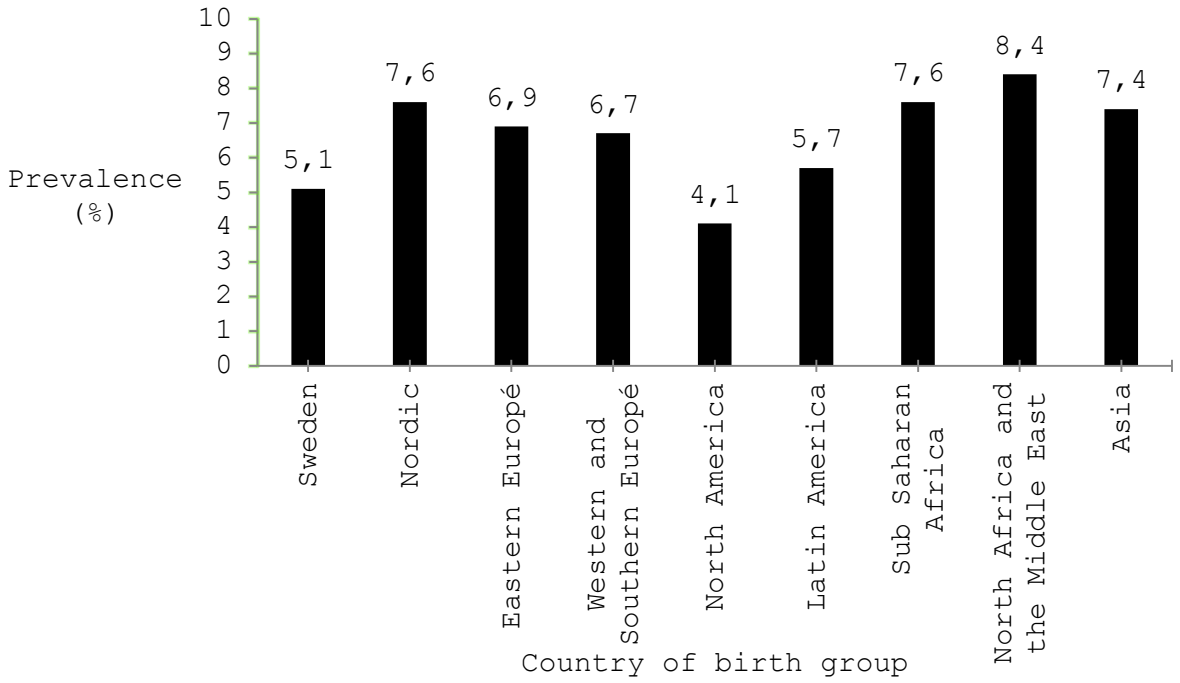

Figure 2: Prevalence (%) of T2DM by country of birth group

6.3 Testing the risk factors for T2DM

To address the second and third aims of the study, it was necessary to determine if there was a statistically significant relationship between the selected risk factors and T2DM. Table 4 is a univariate model with crude and adjusted OR for each risk factor.

COB was a significant risk factor for T2DM for Eastern Europe, Latin America, Sub-Saharan Africa, North Africa and the Middle East and Asia groups compared to Sweden when adjusted for age, gender and education level. Those from Asia (OR 3.47) had the highest risk. Age, gender, BMI, smoking, alcohol, physical activity, vegetable, fruit, processed meat, sweets and sugary drinks all had a statistically significant relationship with T2DM. Snus and fish did not. Unhealthy consumption of vegetables, fruit, sweets and sugary drinks were associated with a lower risk for T2DM. Unhealthy consumption of processed meat was associated with an increased risk (OR 1.31).

BMI was the strongest predictor of diabetes for both overweight (OR 2.13) and obese (OR 6.18) categories in the adjusted model. The lowest OR was for medium consumption of alcohol (0.48). Education level was also a strong predictor; those who completed up to 9 years of primary school (OR 1.90) had a higher risk compared to 2-3 years of secondary school (OR 1.60).

Table 4: Univariate analysis of risk factors and T2DM		
Variable	Crude OR (95% CI)	Adjusted OR^ (95% CI)
COB group		
Sweden (ref)	1	1
Nordic	1.53 (1.35-1.74)*	1.08 (0.95-1.23)
Eastern Europe	1.38 (1.17-1.63)*	1.52 (1.27-1.82)*
Western and Southern Europe	1.33 (1.08-1.65)*	0.96 (0.77-1.20)
North America	0.81 (0.41-1.58)	0.84 (0.42-1.68)
Latin America	1.13 (0.84-1.52)	1.63 (1.20-2.23)*
Sub-Saharan Africa	1.54 (1.12-2.11)*	2.75 (1.93-3.91)*
North Africa and the Middle East	1.71 (1.45-2.03)*	2.77 (2.30-3.34)*
Asia	1.49 (1.16-1.91)*	3.47 (2.66-4.52)*
Age		
18-29(ref)	1	1
30-44	2.22 (1.47-3.37)*	2.67 (1.75-4.09)*
45-64	13.78 (9.34-20.33)*	15.18 (10.21-22.58)*
65-84	33.20 (22.53-48.91)*	32.86 (22.13-48.80)*
Age (continuous)	1.06 (1.06-1.07)*	1.06 (1.05-1.06)*
Gender		
Women (ref)	1	1
Men	1.87 (1.75-2.00)*	1.79 (1.67-1.92)*
BMI		
Normal weight (ref)	1	1
Overweight	2.83 (2.60-3.08)*	2.13 (1.97-2.34)*
Obese	7.50 (6.86-8.21)*	6.18 (5.65-6.81)*
BMI (continuous)	1.17(1.16-1.18)*	1.17 (1.16-1.18)*
Education Level		
Post-secondary or more (ref)	1	1
2-3 years of secondary school	1.91 (1.76-2.06)*	1.60 (1.47-1.73)*
Up to 9 years of primary school	3.07 (2.80-3.35)*	1.90 (1.73-2.09)*
Smoking		
Never (ref)	1	1
Former	1.76 (1.64-1.89)*	1.25 (1.16-1.34)*
Current	1.46 (1.32-1.63)*	1.27 (1.14-1.41)*

Variable	Crude OR (95% CI)	Adjusted OR^ (95% CI)
Snus		
Never (ref)	1	1
Former	1.08(0.96-1.21)	1.07(0.95-1.22)
Current	0.90(0.80-1.02)	1.06(0.93-1.21)
Daily Alcohol Consumption		
No Alcohol (ref)	1	1
Low	0.61(0.56-0.67)*	0.72 (0.66-0.80)*
Medium	0.42(0.38-0.46)*	0.48 (0.44-0.53)*
High	0.45(0.41-0.49)*	0.51 (0.47-0.56)*
Physical activity: MET mins per week		
High (ref)	1	1
Medium	1.13(1.04-1.22)*	1.15 (1.06-1.26)*
Low	1.00(0.92-1.09)	1.49 (1.37-1.63)*
Diet Indicators		
Vegetables		
Healthy (ref)	1	1
Unhealthy	1.28(1.18-1.38)*	0.80 (0.73-0.87)*
Fruit		
Healthy (ref)	1	1
Unhealthy	0.96(0.89-1.03)	0.78(0.72-0.84)*
Fish		
Healthy (ref)	1	1
Unhealthy	0.93(0.87-0.99)*	1.02(0.95-1.10)
Processed meat		
Healthy (ref)	1	1
Unhealthy	1.48(1.37-1.61)*	1.31(1.20-1.42)*
Sweets		
Healthy (ref)	1	1
Unhealthy	0.50(0.47-0.54)*	0.50(0.46-0.53)*
Sugary Drinks		
Healthy (ref)	1	1
Unhealthy	0.50(0.45-0.55)*	0.57(0.51-0.63)*

*Statistically significant

^Adjusted for age, gender and education level if not already in the model

6.3 COB as an independent risk factor

Once we determined the impact of the selected risk factors on the outcome we could examine COB as an independent risk factor. In this model, we introduced all significant risk factors to determine whether COB was still a risk factor (Table 5). We adjusted for age, gender, BMI, education level, smoking, alcohol, MET minutes per week, vegetables, fruit, processed meat, sweets and sugary drinks. Snus and fish were excluded because they were not statistically significant in the univariate analysis. We found that Nordic, Eastern, Western and Southern Europe, North America and Latin America COB groups were not a risk factor for T2DM compared to Sweden, while Sub-Saharan Africa, North Africa and the Middle East and Asia were. The Eastern Europe and Latin America groups became insignificant predictors in this model compared to the previous one (Tables 4 and 5). Table 5 shows the risk for T2DM by COB group when adjusted for all significant risk factors. Figures 2 and 3 show the two models compared to each other and the change in OR after adjustment for all significant risk factors.

Table 5: Binary logistic regression of COB group and T2DM

COB group	Model 1¤ (95% CI)	Model 2^ (95% CI)
Sweden (ref)	1	1
Nordic	1.08 (0.95-1.23)	0.88 (0.75-1.03)
Eastern Europe	1.52 (1.27-1.82)*	1.09 (0.86-1.37)
Western and Southern Europe	0.96 (0.77-1.20)	0.86 (0.65-1.13)
North America	0.84 (0.42-1.68)	0.90 (0.41-2.01)
Latin America	1.63 (1.20-2.23)*	1.07 (0.69-1.64)
Sub-Saharan Africa	2.75 (1.93-3.91)*	2.34 (1.47-3.72)*
North Africa and the Middle East	2.77 (2.30-3.34)*	2.32 (1.83-2.94)*
Asia	3.47 (2.66-4.52)*	3.14 (2.23-4.42)*

*Statistically significant
¤Adjusted for age, gender and education level
^Adjusted for age, gender, education level, BMI, smoking, alcohol, MET mins per week, vegetables, fruit, processed meat, sweets, and sugary drinks

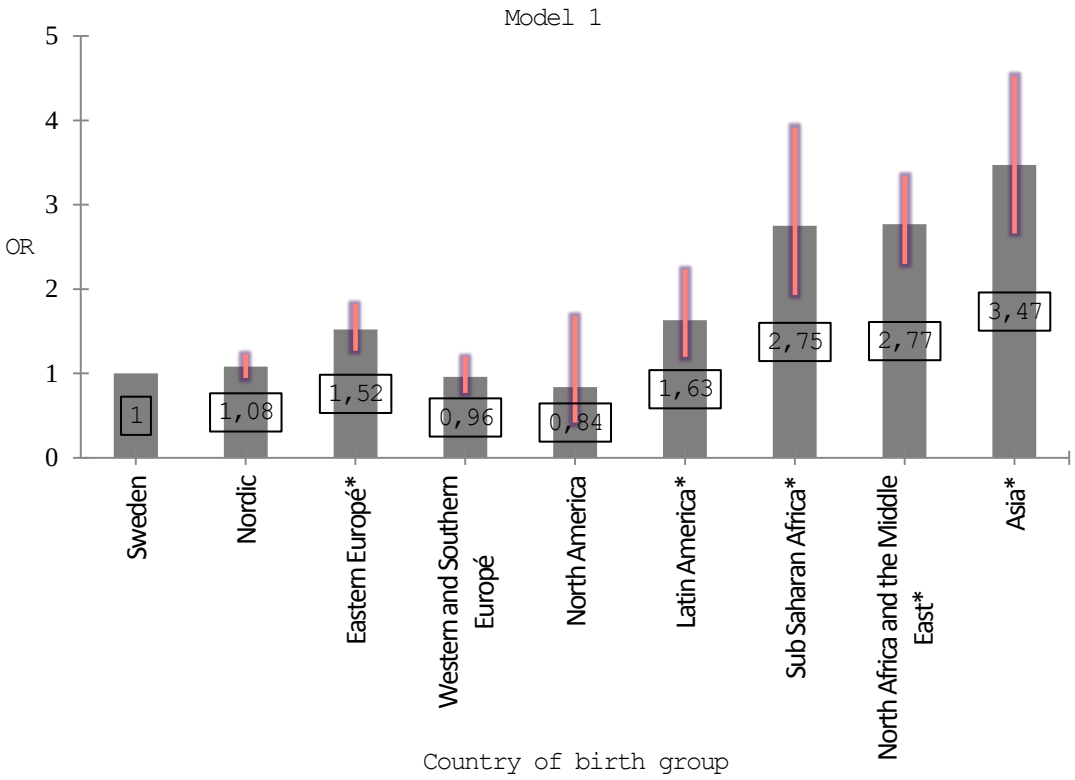

Figure 2: Risk for T2DM by COB group adjusted for age, gender and education level

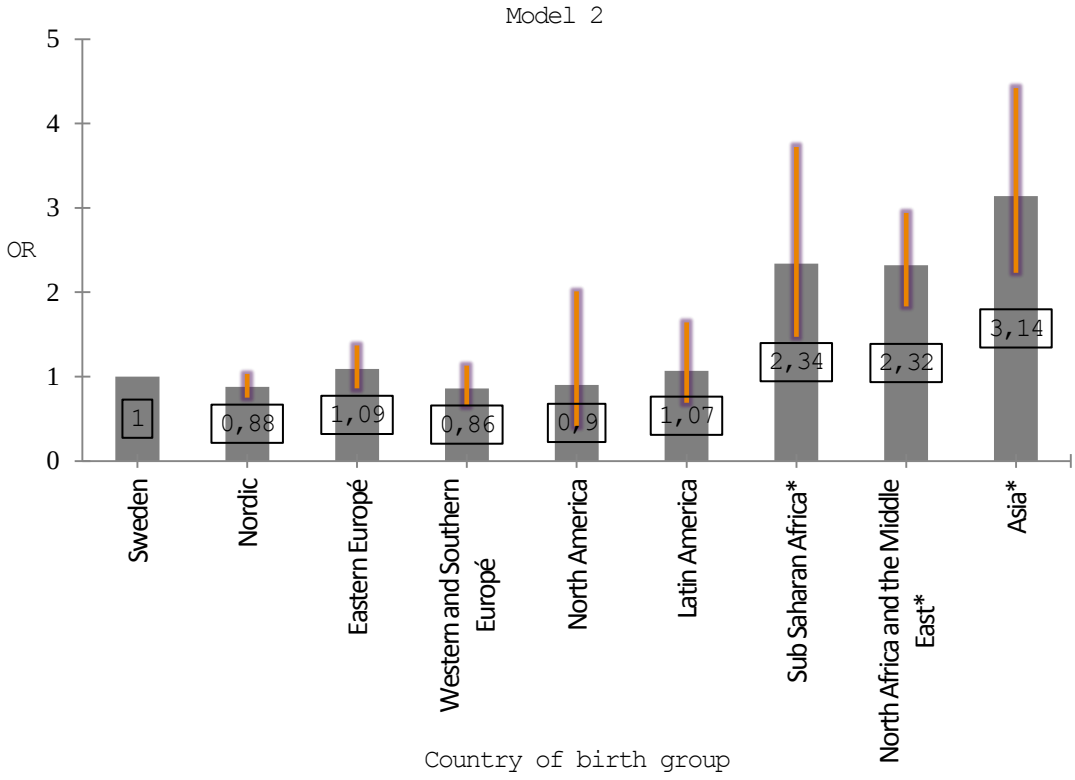

Figure 3: Risk for T2DM by COB group adjusted for all significant risk factors

6.4 Stratification by COB group

This section of the analysis allowed us to meet the third and fourth aims of the study—to describe differences in risk factors and their magnitude by ethnic group. We stratified our data set by COB group and did a descriptive analysis including means and standard deviations for age, BMI, cigarettes per day (former and current smokers combined), grams of alcohol per day, and MET minutes per week (Table 6). Following this, we introduced all significant risk factors from the univariate model into each COB model and conducted a regression analysis (Table 7). This allowed us to examine each group independently and understand which risk factors were significant predictors of T2DM.

Table 6: Description of risk factors by COB group [n *(%)*]

Variable	Sweden (n=60004)	Nordic (n=3816)	Eastern Europe (n=2335)	Western and Southern Europe (n=1396)	Latin America (n=827)	SS Africa (n=563)	North Africa and the Middle East (n=1857)	Asia (n=943)
Mean Age (S.D)	52.3 (16.4)	60.4 (12.7)	51.1 (15.6)	57.5 (16.3)	47.8 (13.7)	44.2 (11.9)	46.5 (12.9)	42.7 (13.2)
Age								
18-29	5739 (9.6)	53 (1.4)	198 (8.5)	70 (5.0)	79 (9.6)	57 (10.1)	205 (11.0)	159 (16.9)
30-44	15109 (25.2)	399 (10.5)	678 (29.0)	295 (21.1)	268 (42.0)	240 (42.6)	586 (31.6)	400 (42.4)
45-64	22596 (37.7)	1851 (48.5)	934 (40.0)	440 (31.5)	385 (46.6)	234 (41.6)	909 (48.9)	327 (34.7)
65-84	16560 (27.6)	1513 (39.6)	525 (22.5)	591 (42.3)	95 (11.5)	32 (5.7)	157 (8.5)	57 (6.0)
Gender								
Women	33337 (55.6)	2494 (65.4)	1378 (59.0)	654 (46.8)	475 (57.4)	288 (51.2)	906 (48.8)	614 (65.1)
Men	26667 (44.4)	1322 (34.6)	957 (41.0)	742 (53.2)	352 (42.6)	275 (48.8)	951 (51.2)	329 (34.9)
Mean BMI (S.D)	25.2 (4.1)	26.1 (4.4)	25.9 (4.2)	25.6 (25.6)	26.1 (4.3)	25.0 (3.7)	26.2 (4.1)	23.9 (3.8)
BMI								
Normal Weight	31586 (54.0)	1657 (45.2)	1016 (44.7)	671 (49.7)	359 (44.9)	272 (52.7)	735 (41.5)	597 (65.5)
Overweight	20177 (34.5)	1388 (37.9)	892 (39.3)	488 (36.1)	312 (39.0)	187 (36.2)	758 (42.8)	253 (27.7)
Obese	6707 (11.2)	619 (16.9)	363 (16.0)	191 (14.1)	128 (16.0)	57 (11.0)	279 (15.7)	62 (6.8)
Education Level								
Post-secondary or more	26839 (44.9)	1133 (30.0)	969 (43.3)	603 (44.8)	354 (43.9)	189 (36.8)	785 (44.7)	441 (50.3)
2-3 years of secondary school	24292 (40.7)	1636 (43.3)	896 (40.1)	532 (39.6)	342 (42.4)	218 (42.5)	631 (36.0)	287 (32.7)
Up to 9 years of primary school	8661 (14.4)	1007 (26.7)	372 (16.6)	210 (15.6)	111 (13.8)	106 (20.7)	339 (19.3)	149 (17.0)
Mean Smoking (cigs/day) (S.D)	12.5 (6.9)	13.5 (7.4)	13.9 (7.8)	13.5 (8.6)	9.1 (6.7)	12.2 (7.6)	13.3 (8.5)	9.6 (6.5)
Smoking								
Never	32512 (55.1)	1721 (46.4)	1181 (52.1)	706 (51.5)	485 (60.1)	419 (77.2)	1166 (65.0)	659 (71.7)
Former	345 (34.5)	1415 (38.2)	643 (28.4)	501 (36.5)	227 (28.1)	70 (22.8)	297 (16.4)	132 (14.4)
Current	6135 (10.4)	572 (15.4)	444 (19.6)	165 (12.0)	95 (11.8)	54 (9.9)	332 (18.5)	128 (13.9)

	Sweden	Nordic	Eastern Europe	Western and Southern Europe	Latin America	SS Africa	North Africa and the Middle East	Asia
Mean Alcohol (g/day) (S.D)	14.9 (16.4)	13.3 (8.9)	8.9 (13.8)	9.6 (14.4)	7.9 (11.3)	5.5 (13.5)	4.6 (10.1)	6.4 (10.6)
Alcohol Consumption								
No Alcohol	8700 (14.5)	898 (23.5)	858 (36.7)	268 (19.2)	260 (31.4)	329 (58.4)	1068 (57.5)	430 (45.6)
Low	13349 (22.2)	802 (21.0)	587 (25.1)	357 (25.6)	280 (33.9)	125 (22.2)	492 (26.5)	252 (26.7)
Medium	19264 (32.1)	1073 (28.1)	512 (21.9)	429 (30.7)	179 (21.6)	54 (9.6)	183 (9.9)	151 (16.0)
High	18691 (31.1)	1043 (27.3)	378 (16.2)	342 (24.7)	108 (13.1)	55 (9.8)	114 (6.1)	110 (11.7)
Physical Activity: MET mins per wk Mean (S.D)	17148 (1820)	17363 (1884)	17271 (1866)	17164 (1840)	17738 (1987)	17753 (2021)	17197 (1902)	17474 (1925)
Physical Activity: MET mins per wk								
High	19241 (33.3)	1186 (33.3)	727 (33.3)	440 (33.3)	255 (33.3)	164 (33.3)	566 (33.3)	293 (33.4)
Medium	19243 (33.3)	1186 (33.3)	726 (33.3)	442 (33.4)	256 (33.4)	164 (33.3)	567 (33.4)	293 (33.4)
Low	19246(33.3)	1186 (33.3)	729 (33.4)	441 (33.3)	255 (33.3)	164 (33.3)	565 (33.3)	292 (33.3)
Diet Indicators								
Vegetables								
Healthy	16133 (27.9)	988 (27.5)	599 (28.1)	358 (27.1)	197 (26.2)	107 (21.1)	456 (26.8)	331 (38.4)
Unhealthy	41661 (72.1)	2609 (72.5)	1529 (71.9)	962 (72.9)	554 (73.8)	397 (78.8)	1247 (73.2)	531 (61.6)
Fruit								
Healthy	16232 (28.0)	1202 (33.2)	760 (35.5)	438 (32.8)	210 (27.6)	111 (22.1)	602 (34.8)	263 (29.9)
Unhealthy	41773 (72.0)	2421 (66.8)	1379 (59.1)	897 (67.2)	550 (72.4)	391 (77.9)	1128 (65.2)	617 (70.1)
Processed Meat								
Healthy	48492 (83.5)	2979 (82.5)	1811 (86.8)	1147 (87.0)	647 (88.3)	396 (88.2)	1484 (92.2)	728 (87.1)
Unhealthy	9577 (16.5)	631 (17.5)	275 (13.2)	171 (13.0)	86 (11.7)	53 (11.8)	125 (7.8)	108 (12.9)
Sweets								
Healthy	21098 (35.9)	1422 (38.7)	884 (40.2)	509 (37.6)	398 (51.2)	347 (68.7)	826 (46.8)	453 (50.7)
Unhealthy	37691 (64.1)	2255 (61.3)	1314 (59.8)	845 (62.4)	379 (48.8)	158 (31.3)	939 (53.2)	440 (49.3)
Sugary Drinks								
Healthy	46200 (79.6)	2953 (82.0)	1539 (72.5)	1058 (80.4)	489 (65.1)	304 (62.2)	1080 (62.7)	629 (67.8)
Unhealthy	11847 (20.4)	650 (18.0)	583 (27.5)	258 (19.6)	262 (34.9)	185 (37.8)	643 (37.3)	281 (32.2)

Table 7: Binary logistic regression of significant risk factors and T2DM, stratified by COB group

Variable	Sweden (n=60004)	Nordic (n=3816)	Eastern Europe (n=2335)	Western and Southern Europe (n=1396)	Latin America (n=827)	SS Africa (n=563)	North Africa and the Middle East (n=1857)	Asia (n=943)
Age	1.07 (1.06-1.07)*	1.06 (1.04-1.08)*	1.07 (1.05-1.09)*	1.07 (1.04-1.09)*	1.08 (1.04-1.12)*	1.09 (1.03-1.15)*	1.07 (1.05-1.09)*	1.06 (1.03-1.09)*
Gender								
Women	1	1	1	1	1	1	1	1
Men	1.96(1.79-2.16)*	1.98 (1.43-2.74)*	2.46(1.48-4.09)*	1.97(1.07-3.60)*	0.75(0.28-2.02)	1.10(0.30-3.99)	0.96(0.58-1.61)	1.68(0.80-3.53)
BMI								
Normal Weight	1	1	1	1	1	1	1	1
Overweight	2.05(1.84-2.29)*	3.03(1.98-4.66)*	2.48(1.30-4.67)*	2.71(1.36-5.41)*	1.75(0.55-5.51)	2.32(0.69-7.78)	2.10(1.15-3.81)*	2.56(1.18-5.55)*
Obese	6.20(5.50-6.98)*	6.83(4.34-10.73)*	6.73(3.44-13.14)*	3.96(1.81-8.66)*	3.61(1.01-12.88)*	2.40(0.51-11.21)	4.34(2.24-8.40)*	6.60(2.37-18.41)*
Education Level								
Post-secondary or more	1	1	1	1	1	1	1	1
2-3 years of secondary school	1.41(1.27-1.56)*	1.03(0.68-1.55)	0.82(0.48-1.40)	1.67(0.88-3.16)	1.97(0.72-5.41)	4.49(1.18-17.05)*	0.90(0.53-1.55)	1.89(0.90-4.00)
Up to 9 years of primary school	1.43(1.26-1.63)*	1.29(0.83-2.01)	1.41(0.75-2.65)	1.65(0.74-3.63)	2.65(0.69-10.19)	5.18(1.05-25.54)*	1.38(0.75-2.53)	0.99(0.33-2.94)
Smoking								
Never	1	1	1	1	1	1	1	1
Former	1.29(1.17-1.42)*	1.12(0.80-1.59)	1.31(0.78-2.20)	1.26(0.69-2.29)	0.88(0.31-2.50)	1.60(0.43-5.95)	1.35(0.76-2.38)	0.92(0.34-2.48)
Current	1.41(1.21-1.63)*	1.16(0.71-1.89)	1.28(0.66-2.48)	1.46(0.60-3.54)	1.55(0.44-5.41)	3.78(0.66-21.62)	0.89(0.45-1.73)	0.89(0.32-2.49)
Alcohol Consumption								
No Alcohol	1	1	1	1	1	1	1	1
Low	0.81(0.71-0.93)*	0.87(0.57-1.32)	1.10(0.61-1.97)	1.66(0.72-3.82)	0.65(0.21-2.08)	0.17(0.03-0.98)*	0.44(0.24-0.81)*	0.76(0.32-1.80)
Medium	0.53(0.47-0.61)*	0.57(0.37-0.88)*	0.66(0.34-1.28)	1.16(0.51-2.65)	0.67(0.20-2.28)	1.40(0.27-7.11)	0.39(0.16-0.93)*	0.75(0.26-2.15)
High	0.52(0.46-0.60)*	0.44(0.28-0.72)*	0.59(0.28-1.23)	0.86(0.35-2.10)	0.76(0.16-3.49)	0.48(0.06-3.72)	0.22(0.05-1.00)*	0.97(0.28-3.33)
Physical Activity: MET mins per wk								
High	1	1	1	1	1	1	1	1
Medium	1.14(1.02-1.27)	1.15(0.78-1.71)	0.91(0.51-1.62)	1.10(0.56-2.19)	1.07(0.38-3.04)	1.02(0.23-4.39)	1.32(0.73-2.39)	1.56(0.69-3.55)
Low	1.28(1.15-1.43)*	1.48(1.01-2.18)*	0.93(0.52-1.66)	1.68(0.85-3.31)	0.67(0.21-2.14)	2.32 (0.60-8.94)	1.46(0.81-2.61)	0.88(0.35-2.20)

	Sweden	Nordic	Eastern Europe	Western and Southern Europe	Latin America	SS Africa	North Africa and the Middle East	Asia
Diet Indicators								
Vegetables								
Healthy	1	1	1	1	1	1	1	1
Unhealthy	0.86(0.77-0.97)*	0.72(0.49-1.06)	0.75(0.42-1.32)	0.81(0.40-1.65)	0.37(0.14-1.00)*	0.82(0.19-3.61)	1.15(0.65-2.04)	0.99(0.43-2.30)
Fruit								
Healthy	1	1	1	1	1	1	1	1
Unhealthy	0.73(0.66-0.82)*	0.88(0.61-1.25)	0.91(0.52-1.59)	0.91(0.47-1.76)	1.60(0.58-4.40)	1.47(0.30-7.24)	0.79(0.47-1.34)	0.66(0.28-1.57)
Processed Meat								
Healthy	1	1	1	1	1	1	1	1
Unhealthy	1.40(1.25-1.56)*	1.59(1.10-2.31)*	1.04(0.53-2.06)	0.99(0.46-2.17)	0.74(0.17-3.16)	0.33(0.03-3.26)	1.31(0.51-3.40)	0.94(0.26-3.45)
Sweets								
Healthy	1	1	1	1	1	1	1	1
Unhealthy	0.57(0.52-0.63)*	0.44(0.32-0.61)*	0.26(0.16-0.43)*	0.69(0.39-1.22)	1.24(0.49-3.11)	0.16(0.03-0.91)*	0.48(0.30-0.78)*	0.58(0.27-1.25)
Sugary Drinks								
Healthy	1	1	1	1	1	1	1	1
Unhealthy	0.59(0.51-0.68)*	0.27(0.15-0.48)*	0.81(0.43-1.53)	0.57(0.25-1.28)	0.32(0.09-1.17)	0.19(0.03-1.02)*	0.64(0.37-1.10)	0.52(0.20-1.39)

* Statistically significant

6.4.1 Differences in risk factors across COB groups

Age and gender: age was a significant risk factor across all COB groups (Table 7). Male gender was a risk factor for Europeans, with men having nearly twice the risk as compared to women.

BMI, education level, and behavioural risk factors: BMI was the strongest risk factor for all groups except Sub-Saharan Africa. This was most apparent in the Nordic group with 'overweight' having an OR of 3.03 and 'obese' an OR of 6.83. Low education level was associated with elevated risk for Sweden and Sub-Saharan Africa (Table 7). For behavioural risk factors, smoking increased risk only for Sweden. Low physical activity and sedentary behaviour increased risk in the Sweden (OR 1.28) and Nordic groups (OR. 1.48). We found that alcohol consumption in the Sweden, Nordic and North Africa and the Middle East groups reduced risk for T2DM.

Diet indicators: Most diet indicators were not strong risk factors. Unhealthy vegetable consumption was associated with lower risk of T2DM for Sweden and Latin America. Unhealthy fruit intake was also associated with a lower risk, only for Sweden. Unhealthy consumption of sweets was associated with a lower risk of T2DM for Sweden, Nordic, Eastern Europe and Sub-Saharan Africa. Unhealthy consumption of sugary drinks was associated with a lower risk for Sweden, Nordic and Sub-Saharan Africa. Unhealthy consumption of processed meat was associated with a higher risk for the Sweden (OR 1.40) and Nordic (OR 1.59) groups.

7. Discussion

7.1 Main findings

Risk factors

We found that older age, male gender, BMI considered obese or overweight, low education level, former or current smoking, and low physical activity increased the risk for T2DM. These results are in accordance with the literature. (7, 9) Snus and fish consumption were not significant predictors. Alcohol consumption was associated with a reduced risk, also in line with the literature. (34) For the diet indicators, unhealthy consumption of vegetables and fruit were associated with lower risk for T2DM despite it being known that this increases risk. (35) Unhealthy consumption of sweets and sugary drinks were also associated with a lower risk, despite being established risk factors. (36, 37) These diet results could be

due to reverse causation which will be discussed further. Unhealthy consumption of processed meat increased risk which is in agreement with the literature. (38)

COB as an independent risk factor

COB as an approximation for ethnicity was an independent risk factor for T2DM. Our result showed that the North Africa and the Middle East group had the highest prevalence of T2DM compared to other groups (Table 3) which was consistent with another study. (39) Furthermore, our regression analysis showed that being born in Sub-Saharan Africa, North Africa and the Middle East and Asia was a risk factor for T2DM when adjusted for demographic and behavioural risk factors and BMI (Table 6). This finding is supported by other studies in this area. (5, 12, 13, 15) Compared to Swedish-born individuals, those from North Africa and the Middle East and Sub-Saharan Africa had a 2.3 times higher risk, while those from Asia had a 3.1 times higher risk. The North Africa and the Middle East group is of particular interest because of the large number of immigrants to Sweden. Reasons for their increased risk are thought to be related to genetically determined higher insulin resistance and lower glycaemic control. (12)

Relative to Sweden, the Nordic, Eastern, Western, and Southern Europe, North America and Latin America groups were not strong predictors for T2DM. Our analysis showed that the significantly higher prevalence of T2DM among Latin Americans could be attributable to higher BMI and greater sugar intake (Table 6). For Eastern Europe it could be explained by higher BMI and smoking. After adjusting for these factors COB was no longer significant.

Magnitude of risk factors across COB groups

Age, gender and BMI

The most consistent risk factors across COB groups were age, gender and BMI. This finding was supported by a study similar to ours. (40) Risk from BMI was more pronounced in certain groups than in others. For instance, Asia and European groups had nearly a seven-fold increased risk due to obesity. The noticeable influence of BMI in the Asian group warrants further discussion. It has been reported that high BMI appears to disproportionately affect this population. (15) Palaniappan et al. demonstrated that the prevalence of metabolic disorder in white men with a BMI of 25 kg/m^2 was comparable to the prevalence

among Asians with a BMI of 20 kg/m^2. (41) The exact reason for the difference is unclear but it is thought to be related to ethnic variances in body fat distribution as Asians have more central adiposity, an established risk factor for T2DM. (42)

Education level

Low education level was a strong risk factor in the Sub-Saharan Africa and Sweden groups. In a recent study from the United States it was reported that nearly half of the risk for T2DM in those with African ethnicity could be explained by socioeconomic position and education level. (10) Our finding is similar to this as low education increased the risk nearly fivefold in the Sub-Saharan Africa group.

Education level is an increasingly important area of study when examining risk for T2DM. It is thought to reflect the material and intellectual resources of individuals and their families. (9, 43) This can be explained by the concept of 'health literacy' which aims to quantify how skills related to reading, listening, obtaining and processing health information impact how people manage chronic disease. (44) In a systematic review it was reported that low health literacy was attributable to poorer ability to process and understand health knowledge and differences in use of health services, particularly those for screening and early detection. (45)

Another systematic review looking at risk for T2DM and education level in high, middle and low income countries found that increased risk from low education level was consistent across all settings. (9) As well, a study highlighted that BMI and other detrimental lifestyle factors such as smoking and poor diet affected those with low education more, increasing their risk. (40)

These findings from the literature provide insights for our result; it is possible that there was an underestimation of risk associated with low education level because of undiagnosed cases of T2DM. Those with low education may not have been able to navigate the health care system properly or understand health literature about diabetes and as a result were never diagnosed. This means low education may in fact have a greater risk for T2DM than was measured.

Reduced risk for T2DM with alcohol consumption

For the Sweden, Nordic and North Africa and the Middle East groups, alcohol consumption was associated with a lower risk for T2DM. In fact, increased consumption was correlated with a greater reduction in risk (Table 7). For other groups, the trend suggested the same relationship.

This finding contributes to the current discussion surrounding the protective effects of alcohol consumption against T2DM. Literature points to a 'j' shaped model, with non-consumers and high-consumers being at risk, while those with moderate consumption reap a protective effect. (46) Studies have suggested that moderate consumption can reduce the risk for T2DM by 30-40 per cent. (34, 47-49) A recent review found that it was more protective in men than women and that regular consumption of small amounts, approximately 15 grams per day (equivalent to one glass of wine) at least five days per week was ideal for risk reduction. (34, 50) Possible mechanisms for the protective effect are improved insulin sensitivity, and better long term glycaemic control. (34) This finding is important regarding prevention and treatment—counselling should not discourage moderate alcohol consumption.

Our categorization of alcohol showed that 'high' consumers (≥22.56g/day for men, ≥13.97g/day for women) had the lowest risk. In the Sweden and Nordic groups, it was a two-fold reduction and four-fold in the North Africa and the Middle East group. One study found that heavy consumption did not increase risk for T2DM but was not protective either. (50) This finding warrants further investigation, it would be useful to examine alcohol as a continuous variable and to study men and women separately. Also, it suggests that moderate consumption of alcohol could counteract genetically determined lowered insulin sensitivity. Those of North African or Middle Eastern ethnicity who have been shown to be genetically predisposed to higher insulin resistance and poorer glycaemic control could benefit from moderate consumption.

Tobacco use

Smoking was a significant risk factor for the Sweden group with current and former smokers having a higher risk for T2DM. We thought that it would have affected more groups because it is strongly associated with poor glycaemic control and insulin suppression. (51, 52) One study conducted in Stockholm found that risk for T2DM was 30 per cent higher in current and former compared to never smokers which is very similar to our figures. (53) A rea-

son for why smoking was not a risk factor across all the groups could be due to our categorization of the variable. We did not include information on the number of cigarettes smoked per day in the analysis. This has been put forth as a reason for why it was not as strong a risk factor as initially believed in studies examining the risk associated between smoking and T2DM. (8) The Swedish study found that those who smoked 25 cigarettes or more per day had a 3 times higher risk for T2DM. (53) If we had based our analysis on amount we might have found a similar result.

Snus was not a risk factor for T2DM. (Table 4) Nevertheless, it is of particular relevance to Sweden due to its high user prevalence and its creation here in the 18th century. Rapid shifts are occurring from smoking to snus because it is believed there is less harm associated with it. (54) However, a recent review highlighted that risk for T2DM from snus still remains unclear. (55) One study reported that only high use (more than 4 cans per week) was associated with risk. (56) If we examined snus based on usage amount we might have seen this result.

Overall, managing tobacco use would be beneficial for T2DM prevention. (53)

Physical activity and sedentary behaviour

Low physical activity and sedentary behaviour characterised by low MET minutes per week increased risk in the Sweden and Nordic groups. It is accepted that sedentary behaviour increases the risk for T2DM thus we thought this would be apparent across all the groups. (57) A possible reason for our result could be due to our ranking of the variable into tertiles as there were no established cut offs for MET. Examining it as a continuous variable could have better illustrated risk. Still, physical activity promotion is important across all groups because it is an established intervention for reducing the risk of T2DM. (57)

Diet

When it comes to the understanding of the results of more unhealthy diet associated with lower risk, reverse causation should be discussed in this cross-sectional study. It is well known that a healthy diet lowers the risk for T2DM. (58) A meta-analysis examining dietary patterns found those consisting of healthy foods such as whole grain products, fruits and vegetables decreased risk while those with unhealthy foods like processed meat, sweets and sugars increased risk. (58) This is what we expected to find. Reverse causation would suggest that those with T2DM changed their lifestyle as a result of counselling or some other intervention, to control it. This could have expressed itself in our results as those with T2DM

may now have a low intake of unhealthy foods while those who do not are not concerned with controlling intake and have a high intake. This would explain the lower OR for unhealthy intake of sugary drinks and sweets, despite the fact we know these are risk increasing. (36, 58) A longitudinal study would have showed to what extent individuals changed their diet after being diagnosed with T2DM.

Recent recommendations for diabetics from the Stockholm County Council emphasise that diet should be largely made up of vegetables, pulses, legumes (500 grams per day), fruits (2-3 per day) as well as whole grains and fish. (59) Portion size should be controlled and it is preferable for food to be evenly distributed throughout the day. Higher glycaemic carbohydrates like potato and rice should be given less priority compared to vegetables and meat. Fruit juices, soft drinks, and fruit yoghurts are not recommended while sweets and desserts are highly discouraged.

Given these recommendations, if counselled, diabetics would likely reduce consumption of sugary drinks and sweets explaining our results and indicating reverse causation.

Unhealthy consumption of processed meat was a risk factor for the Sweden and Nordic groups. While it is not entirely understood why processed meat increases risk for T2DM the findings of a recent meta-analysis offer insight suggesting it is attributable to confounders, such as unhealthy lifestyle which can lead to consumption of processed meat and other low quality foods. (38)

Our adjusted analysis showed that fish consumption was not statistically significant. A meta-analysis highlighted that fatty fish in particular was found to be protective against T2DM because it contains alpha linolenic acid which may inhibit expression of genes related to diabetes. (60) It was suggested that consumption of fatty fish would reduce risk. It is important to note that before adjustment, fish had a statistically significant risk lowering association with T2DM, which is in accordance with the literature (Table 4). (60)

7.2 Strengths

The large sample size which included many different ethnic groups was a strength of our study because it allowed us to meet the proposed aims. Also, having our study confined to one area was beneficial. When studying ethnic differences in T2DM it is advantageous that study participants live in the same geographical area in order to minimise the effects of environmental factors like climate, pollution or microorganisms causing infectious

diseases, which vary widely in different parts of the world, and may increase the risk of T2DM. Additionally, stratifying our data set by COB made it possible to demonstrate that certain risk factors do not impact COB groups in the same way. This allowed us to suggest which ones should be prioritized when planning prevention strategies and the need for ethnically focused prevention. We believe our study has added knowledge to this research area and created new avenues for ethnically focused studies.

7.3 Limitations

COB as a measure of ethnicity

We used COB as a proxy for ethnicity which we then categorized into geographical groups. Thus, it is conceivable that ethnicities were clumped together lowering the sensitivity of the analysis. Of course, one needs to be aware of generalisations from categorising different countries into one group. Also, using COB does not account for the role of genes.

Our way of approximating ethnicity is one way to measure it. It is critical to appreciate that while there are biological differences to ethnicity there is also a socio-cultural dimension. (61) It can also be quantified by the group one belongs to or identifies with based on language, diet, and religion. (62) Therefore, it may influence health through other mechanisms and processes, not only genes, which interact at the individual, institutional and community levels. (61) Biological factors may predispose one to T2DM, but cultural practices (e.g. abstaining from alcohol), behaviours and attitudes could impact risk for the disease—beliefs about health care and health care seeking behaviour can be shaped by ethnicity. In our study, a respondent of non-Swedish ancestry but who was born in Sweden would have been considered Swedish. As such, this may have led them to take on the characteristics of Swedish culture through practices, beliefs and diet. This would have impacted their risk for developing T2DM. Thus, ethnicity is a fluid concept, not solely bound to genetic makeup. (61) Exploring ethnicity as a risk factor for T2DM cannot be confined to genetics and using COB is another useful way to investigate it as it may encompass socio-cultural factors.

Self-reported data, recall bias, diabetes cut-off age, misclassification, small COB groups

All data from the survey was self-reported therefore its accuracy could not be verified. Some questions, in particular those regarding diet and physical activity, which asked respondents to answer based on frequency over a period of time, could have been affected by

recall bias. It is possible that answers were not accurate as some information could have been forgotten. Also, the inclusion age for having been diagnosed with diabetes began at 20 years meaning those who were below and indicated they had diabetes were thought to have type 1 and excluded from the analysis. Cases of T2DM could have been ruled out as a result but since onset is generally later in life, risk for having it at a young age is low. (26, 27) Also, it is important to recognize that 30 to 50 per cent of T2DM cases are believed to be undiagnosed. (63, 64) This would result in misclassification of respondents as non-diabetic. Meaning, the results would be stronger if all diabetics were measured. Lastly, some of the COB groups were small making results less reliable.

Study design and confounders

As this was a cross-sectional study we could not exclude reverse causation between T2DM and behavioural risk factors. A longitudinal study would be needed to determine to this. Unmeasured confounders were possible, such as family history.

7.4 Implications for global health

A benefit of studying COB as a risk factor for T2DM is the potential to use the findings to enhance understanding in LMIC where the burden is greatest. A recent review reported that risk of death from the disease was highest in Middle East and South East Asia. (65) Furthermore, it is thought that Middle East and North Africa bears the majority of the public health burden of T2DM because of their high prevalence. (66) Our findings could be used for developing prevention strategies in these areas because they highlight which risk factors are of greatest concern for different ethnic groups. For those from the Middle East and North Africa, programmes aimed at weight loss and promotion of moderate consumption of alcohol among drinkers would be useful. High income countries should not be overlooked as the burden in expected to increase there as well, particularly in North America due to a large influx of people with ethnicities associated with high risk, such as India. (67) The findings are applicable at the global level because they highlight which groups are most vulnerable and which risk factors could be targeted to prevent further burden.

7.5 Future research, applications of results

Further studies exploring ethnicity as a risk factor are needed as it is a multidimensional concept. We demonstrated that COB as a proxy for ethnicity was a risk factor for T2DM however; deeper exploration into the socio-cultural dimension of ethnicity could be

valuable to fully understand its role. We also showed that not all risk factors affect ethnicities in the same way. As such, ethnically focused studies on specific risk factors would be useful for confirming our results and providing further insight.

Preventative measures for diabetes care may need to evolve from a 'one size fits all' mode of operation to tailored programmes based on ethnicity. More attention, earlier risk assessment and preventative actions for people from Africa, Middle East and Asia could ensure that the most cases are prevented. (68)

8. Conclusion

Prevalence of T2DM differs by ethnic group. Not all risk factors affect ethnic groups in the same way. Focused prevention programmes are needed. Our findings contribute to a growing body of knowledge that ethnicity is an independent risk factor for T2DM.

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Annexes

Annex 1—Grouping of country of birth into 28 categories from Stockholm County Council

RTB_LandNamn	LandKod_1
SVERIGE	1
FINLAND	2
DANMARK	3
ISLAND	4
NORGE	4
BOSNIEN-HERCEGOVINA	5
JUGOSLAVIEN	6
KROATIEN	6
MAKEDONIEN	6
SERBIEN OCH MONTENEGRO	6
SLOVENIEN	6
POLEN	7
IRLAND	8
STORBRITANNIEN OCH NORDIRLAND	8
TYSKA DEM REP (DDR)	9
TYSKLAND	9
FRANKRIKE	10
GREKLAND	10
ITALIEN	10
MALTA	10
MONACO	10
PORTUGAL	10
SPANIEN	10
ESTLAND	11
LETTLAND	11
LITAUEN	11
ALBANIEN	12
BULGARIEN	12
RUMÄNIEN	12
RYSSLAND	12
SOVJETUNIONEN	12

SLOVAKIEN	13
TJECKIEN	13
TJECKOSLOVAKIEN	13
UNGERN	13
BELGIEN	14
LUXEMBURG	14
MOLDAVIEN	14
NEDERLÄNDERNA	14
SCHWEIZ	14
UKRAINA	14
VITRYSSLAND	14
ÖSTERRIKE	14
KANADA	15
USA	15
BARBADOS	16
COSTA RICA	16
DOMINICA	16
DOMINIKANSKA REPUBLIKEN	16
EL SALVADOR	16
GRENADA	16
GUATEMALA	16
HAITI	16
HONDURAS	16
JAMAICA	16
JUNGFRUÖARNA, BRITTISKA	16
KUBA	16
MEXIKO	16
NICARAGUA	16
PANAMA	16
S:T LUCIA	16
TRINIDAD OCH TOBAGO	16
CHILE	17
ARGENTINA	18
BOLIVIA	18
BRASILIEN	18
COLOMBIA	18
ECUADOR	18
GUYANA	18

GAMBIA	21
GHANA	21
GUINEA	21
GUINEA-BISSAU	21
KAMERUN	21
KAP VERDE	21
KENYA	21
KONGO	21
KONGO, DEMOKRATISKA REPUBLI-KEN	21
LIBERIA	21
MADAGASKAR	21
MALAWI	21
MALI	21
MAURETANIEN	21
MAURITIUS	21
MOCAMBIQUE	21
NIGERIA	21
SENEGAL	21
SEYCHELLERNA	21
SIERRA LEONE	21
SWAZILAND	21
SYDAFRIKA	21
TANZANIA	21
TOGO	21
UGANDA	21
ZAMBIA	21
ZIMBABWE	21
IRAN	22
IRAK	23
TURKIET	24
HONGKONG	25
JAPAN	25
KINA	25
KOREA, NORD-	25
KOREA, SYD-	25
TAIWAN	25
FILIPPINERNA	26
INDONESIEN	26

LAOS	26
MALAYSIA	26
MYANMAR	26
SINGAPORE	26
THAILAND	26
VIETNAM	26
AFGHANISTAN	27
ARMENIEN	27
AZERBAJDJAN	27
BANGLADESH	27
GEORGIEN	27
INDIEN	27
KAMBODJA	27
KAZAKSTAN	27
KIRGIZISTAN	27
MONGOLIET	27
NEPAL	27
PAKISTAN	27
SRI LANKA	27
TADJIKISTAN	27
TURKMENISTAN	27
UZBEKISTAN	27
VIETNAM, REP	27
AUSTRALIEN	28
FIJI	28
NYA ZEELAND	28
UPPGIFT SAKNAS	

Annex 2—**28 Country of birth groups from Stockholm County Council**

Bilaga 2 Landgruppering

Sverige
Finland
Danmark
Norge, Island
Bosnien-Hercegovina
Före detta Jugoslavien: Kroatien, Makedonien, Serbien och Montenegro, Serbien, Slovenien, Jugoslavien
Polen
Storbritannien, Irland
Tyskland, DDR
Sydeuropa: Frankrike, Gibraltar, Grekland, Italien, Malta, Monaco, Portugal, San Marino, Spanien, Vatikanstaten
Baltikum: Estland, Lettland, Litauen
Österuropa 1: Albanien, Bulgarien, Rumänien, före detta Sovjetunionen
Österuropa 2: Slovakien, Tjeckien, Tjeckoslovakien, Ungern
Övriga Europa: Ej ovan definierade länder.
Kanada, USA
Nordamerika (exklusive Kanada, USA) inklusive Centralamerika
Chile
Sydamerika exklusive Chile
Djibouti, Eritrea, Etiopien, Somalia, Sudan
Nordafrika och Mellanöstern: Algeriet, Förenade Arabemiraten, Arabrepubliken Egypten, Bahrain, Cypern, Egypten, Franska Marocko, Gaza-området, Israel, Jordanien, Kuwait, Libanon, Libyen, Marocko, Palestina, Qatar, Saudiarabien, Syrien, Sydyemen, Tunisien, Västbanken, Yemen
Övriga Afrika: Ej ovan definierade länder
Iran
Irak
Turkiet
Östasien: Hongkong, Japan, Kina, Korea, Taiwan
Sydostasien: Burma, Filippinerna, Indonesien, Laos, Malajiska förbundet, Malaysia, Myanmar, Singapore, Thailand, Vietnam, Österimor
Övriga Asien: Ej ovan definierade länder
Oceanien

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Annex 3—Categorization of 28 country of birth groups into 9 geographical groups

Sverige	1
Finland	2
Danmark	2
Norge, Island	2
Bosnien-Hercegovina	3
Före detta Jugoslavien: Kroatien, Makedonien, Serbien och Montenegro, Serbien, Slovenien, Jugoslavien	3
Polen	3
Storbritannien, Irland	4
Tyskland, DDR	4
Sydeuropa: Frankrike, Gibraltar, Grekland, Italien, Malta, Monaco, Portugal, San Marino, Spanien, Vatikanstaten	4
Baltikum: Estland, Lettland, Litauen	3
Österuropa 1: Albanien, Bulgarien, Rumänien, före detta Sovjetunionen	3
Österuropa 2: Slovakien, Tjeckien, Tjeckoslovakien, Ungern	3
Övriga Europa: Ej ovan definierade länder.	4
Kanada, USA	5
Nordamerika (exklusive Kanada, USA) inklusive Centralamerika	6
Chile	6
Sydamerika exklusive Chile	6
Djibouti, Eritrea, Etiopien, Somalia, Sudan	7
Nordafrika och Mellanöstern: Algeriet, Förenade Arabemiraten, Arabrepubliken Egypten, Bahrain, Cypern, Egypten, Franska Marocko, Gaza-området, Israel, Jordanien, Kuwait, Libanon, Libyen, Marocko, Palestina, Qatar, Saudiarabien, Syrien, Sydyemen, Tunisien, Västbanken, Yemen	8
Övriga Afrika: Ej ovan definierade länder	7
Iran	8
Irak	8
Turkiet	3
Östasien: Hongkong, Japan, Kina, Korea, Taiwan	9
Sydostasien: Burma, Filippinerna, Indonesien, Laos, Malajiska förbundet, Malaysia, Myanmar, Singapore, Thailand, Vietnam, Östtimor	9
Övriga Asien: Ej ovan definierade länder	9
Oceanien	N/A

1=Sweden, 2=Nordic, 3=Eastern Europe, 4=Western and Southern Europe, 5=North America, 6=Latin America, 7=Sub-Saharan Africa, 8=North Africa and the Middle East, 9=Asia

***Annex 4*—Hälsoenkät 2010 Survey**

<u>Questions used for this study</u>

Variable and corresponding question number

General information: 1, 2, 85, 86,

Diabetes: 15a

Diet: 19 a, b, c, d, e, f, h

Physical activity: 20 a, b, c, d, e

Smoking: 21, 22, 23, 24, 25

Snus: 26, 27, 28, 29, 30

Alcohol: 33

Education: 66

Hälsoenkät 2010

En undersökning om hälsa och levnadsförhållanden i Stockholms län

Användarid:
Lösenord:

Stockholms läns landsting

Karolinska Institutet

3

Varför och hur görs *Hälsoenkät 2010*?

Ökar eller minskar olika hälsoproblem? Vilka grupper är mest drabbade? Frågorna är viktiga, exempelvis för att hälso- och sjukvården ska bli så bra som möjligt eller för att skolan i framtiden ska lyckas ge barn och unga förutsättningar för ett friskt liv.
En enkätundersökning är enda sättet att besvara frågorna. Därför gör Stockholms läns landsting tillsammans med Karolinska Institutet en sådan undersökning vart fjärde år. Denna gång skickas enkäten ut till 56 000 slumpvis utvalda personer i Stockholms län i åldern 18 år och uppåt. Svaren samlas in av Statistiska centralbyrån (SCB).

Vad innebär din medverkan?

Du deltar i undersökningen genom att fylla i frågeformuläret. För att minska antalet frågor kommer vi att använda registeruppgifter som redan finns hos SCB. Det är uppgifter om födelseår, kön, födelseland (på gruppnivå), medborgarskap (på gruppnivå) och boendeområde samt information om genomförd utbildning. Även uppgifter om inkomst, yrke, och sysselsättning och arbetsställe samlas in på detta sätt. När du besvarar enkäten innebär det att du godkänner att både de uppgifter som du lämnar i enkäten och registeruppgifterna används. Din medverkan är frivillig och du kan när som helst avbryta den. Det gör du genom att ringa telefonnummer 019-17 69 30. Ange numret högst upp i mitten på enkätens framsida, så att vi vet att det är du och ingen annan som vill utgå.

Så skyddas dina svar

De uppgifter som du lämnar och även de uppgifter som samlas in från register skyddas enligt 24 kap. 8 § offentlighets- och sekretesslagen (2009:400) samt personuppgiftslagen (1998:204). Det innebär att alla som arbetar med undersökningen har tystnadsplikt och att de insamlade uppgifterna endast redovisas i tabeller där ingen enskild persons svar kan utläsas. Numret högst upp på blanketten är till för att SCB under insamlingen ska kunna se vilka som har svarat och vilka som ska få en påminnelse. Efter avslutad bearbetning hos SCB avlägsnas alla identitetsuppgifter innan materialet överlämnas till Stockholms läns landsting. Dina enkätsvar och registeruppgifter kommer också att ligga till grund för forskning vid Karolinska Institutet om orsaker till och konsekvenser av ohälsa. Forskningen omfattas också av statistiksekretessen och måste vara godkänd av Etikprövningsnämnden innan uppgifterna används.

Vad händer sen?

Undersökningens första resultat rapporteras redan nästa år. Genom att hälsoutvecklingen hos deltagarna följs över tid kommer undersökningen efterhand ge viktiga svar på varför sjukdomar och besvär uppkommer och hur de kan förebyggas. Vi kan därför komma att behöva kontakta dig med kompletterande frågor om några år. Medverkan är alltid frivillig, och du bestämmer vid varje tillfälle om du vill delta. För att kunna skicka ut nya enkäter i framtiden behåller SCB ett register över vilka personer som deltar i *Hälsa Stockholm*. Uppgifterna sparas avskilda från enkätsvar och annan registerinformation.

Instruktioner:

Enkäten kommer att läsas maskinellt. När du besvarar enkäten ber vi dig därför tänka på att:

- Använda kulspetspenna med svart eller blå färg, inte röd. Använd inte blyertspenna!
- Skriv tydliga siffror: 1 2 3 4 5 6 7 8 9 0
- Skriv tydliga och STORA bokstäver: A B C D E F G H I J
- Markera dina svar med kryss, så här ☒ och INTE så här: ☒
- Om du vill ändra ditt svar, täck hela rutan: ■

4

Hälsa och sjukdom

1. **Hur lång är du?**
   Svara i hela centimeter.

   ☐☐☐ cm

2. **Hur mycket väger du?**
   Svara i hela kilo. Om du är gravid, svara med hur mycket du brukar väga.

   ☐☐☐ kg

3. **Hur bedömer du ditt allmänna hälsotillstånd? Är det:**

   ☐ Mycket gott
   ☐ Gott
   ☐ Någorlunda
   ☐ Dåligt
   ☐ Mycket dåligt

4. **a) Har du någon långvarig sjukdom, besvär efter olycksfall, handikapp eller annat långvarigt hälsoproblem?**

   ☐ Nej
   ☐ Ja → *Om Ja:*
   b) Medför dessa besvär att din arbetsförmåga är nedsatt eller hindrar dig i dina andra dagliga sysselsättningar?

   ☐ Ja, i hög grad
   ☐ Ja, i någon mån
   ☐ Inte alls

5. **Markera genom att kryssa i en ruta i varje nedanstående grupp, vilket påstående som bäst beskriver ditt hälsotillstånd idag.**

a) Rörlighet

- ☐ Jag går utan svårigheter
- ☐ Jag kan gå men med viss svårighet
- ☐ Jag är sängliggande

b) Hygien

- ☐ Jag behöver ingen hjälp med min dagliga hygien, mat eller påklädning
- ☐ Jag har vissa problem att tvätta eller klä mig själv
- ☐ Jag kan inte tvätta eller klä mig själv

c) Huvudsakliga aktiviteter
(till exempel arbete, studier, hushållssysslor, familje- och fritidsaktiviteter)

- ☐ Jag klarar av mina huvudsakliga aktiviteter
- ☐ Jag har vissa problem med att klara av mina huvudsakliga aktiviteter
- ☐ Jag klarar inte av mina huvudsakliga aktiviteter

d) Smärtor/besvär

- ☐ Jag har varken smärtor eller besvär
- ☐ Jag har måttliga smärtor eller besvär
- ☐ Jag har svåra smärtor eller besvär

e) Oro/nedstämdhet

- ☐ Jag är inte orolig eller nedstämd
- ☐ Jag är orolig eller nedstämd i viss utsträckning
- ☐ Jag är i högsta grad orolig eller nedstämd

6. **Ange hur bra eller dålig din hälsa är idag. Det bästa hälsotillstånd du kan tänka dig är markerat med 100 och det sämsta hälsotillstånd du kan tänka dig är markerat med 0.**

Bästa tänkbara tillstånd

Ange hur du skulle bedöma ditt nuvarande hälsotillstånd, mellan 0 och 100. ☐☐☐

Sämsta tänkbara tillstånd

7. Har du något/några av följande besvär eller symtom?
Markera ett alternativ på varje rad.

		Nej	Ja, lätta besvär	Ja, svåra besvär
a.	Huvudvärk eller migrän?	☐	☐	☐
b.	Ihållande trötthet?	☐	☐	☐
c.	Sömnsvårigheter?	☐	☐	☐
d.	Ängslan, oro eller ångest?	☐	☐	☐
e.	Snarkningar?	☐	☐	☐
f.	Tinnitus (pip, tjut eller susande ljud i öronen)?	☐	☐	☐
g.	Ljudkänslighet?	☐	☐	☐
h.	Inkontinens (urinläckage)?	☐	☐	☐
i.	Reflux (halsbränna, sura uppstötningar)?	☐	☐	☐

8. Blir din röst trött, ansträngd eller hes när du talar?
Bortse från besvär som beror på att du är förkyld/har en luftvägsinfektion.
Besvären kan variera, men försök ange ett genomsnitt.

☐ Nej
☐ Ja, i liten utsträckning
☐ Ja, i stor utsträckning

9. Använder du bärbar ljudspelare (till exempel radio, MP3-spelare, CD-spelare, mobiltelefon, minidisk eller bärbar kassettbandspelare)?

☐ Ja, mer än 2 timmar per dag
☐ Ja, dagligen men mindre än 2 timmar per dag
☐ Ja, någon eller några timmar per vecka
☐ Ja, någon eller några timmar per månad eller mindre
☐ Nej

10. Kan du utan svårighet höra vad som sägs i samtal med flera personer?

☐ Ja, utan hörapparat
☐ Ja, med hörapparat
☐ Nej

11. Har du under *de senaste 12 månaderna* vaccinerat dig mot influensa?

☐ Ja, mot vanlig influensa
☐ Ja, mot svininfluensa
☐ Ja, mot både vanlig influensa och svininfluensa
☐ Nej

12. a) Har du under *de senaste 6 månaderna* haft ont i <u>övre</u> delen av ryggen eller nacken?
Om du har haft ont vid flera tillfällen, försök då uppskatta ett ungefärligt genomsnitt och kryssa i den ruta som ligger närmast.

- ☐ Nej
- ☐ Ja, ett par dagar per månad eller mer sällan
- ☐ Ja, ett par dagar per vecka eller oftare

→ *Om Ja:*
b) Har dessa besvär medfört att din arbetsförmåga varit nedsatt eller att du hindrats i andra dagliga sysselsättningar?

- ☐ Ja, i hög grad
- ☐ Ja, i någon mån
- ☐ Inte alls

13. a) Har du under *de senaste 6 månaderna* haft ont i <u>nedre</u> delen av ryggen?
Om du har haft ont vid flera tillfällen, försök då uppskatta ett ungefärligt genomsnitt och kryssa i den ruta som ligger närmast.

- ☐ Nej
- ☐ Ja, ett par dagar per månad eller mer sällan
- ☐ Ja, ett par dagar per vecka eller oftare

→ *Om Ja:*
b) Har dessa besvär medfört att din arbetsförmåga varit nedsatt eller att du hindrats i andra dagliga sysselsättningar?

- ☐ Ja, i hög grad
- ☐ Ja, i någon mån
- ☐ Inte alls

14. a) Har du under *de senaste 6 månaderna* haft ont i axlar eller armar?
Om du har haft ont vid flera tillfällen, försök då uppskatta ett ungefärligt genomsnitt och kryssa i den ruta som ligger närmast.

- ☐ Nej
- ☐ Ja, ett par dagar per månad eller mer sällan
- ☐ Ja, ett par dagar per vecka eller oftare

→ *Om Ja:*
b) Har dessa besvär medfört att din arbetsförmåga varit nedsatt eller att du hindrats i andra dagliga sysselsättningar?

- ☐ Ja, i hög grad
- ☐ Ja, i någon mån
- ☐ Inte alls

15. Har du av läkare fått någon eller några av följande diagnoser?
Svara med ett kryss antingen "Nej" eller "Ja" för varje diagnos. Om du svarar "Ja" skall du också svara på hur gammal, på ett ungefär, du var när du fick diagnosen.

		Nej	Ja	
a.	Diabetes (sockersjuka)	☐	☐ →	*Om Ja:* Hur gammal var du på ett ungefär när du fick diagnosen? ☐☐ år
b.	Kronisk obstruktiv lungsjukdom (KOL)	☐	☐ →	*Om Ja:* Hur gammal var du på ett ungefär när du fick diagnosen? ☐☐ år
c.	Psoriasis	☐	☐ →	*Om Ja:* Hur gammal var du på ett ungefär när du fick diagnosen? ☐☐ år
d.	Förhöjda blodfetter	☐	☐ →	*Om Ja:* Hur gammal var du på ett ungefär när du fick diagnosen? ☐☐ år
e.	Angina pectoris (kärlkramp, kranskärlssjukdom med smärta i bröstet)	☐	☐ →	*Om Ja:* Hur gammal var du på ett ungefär när du fick diagnosen? ☐☐ år
f.	Hjärtsvikt	☐	☐ →	*Om Ja:* Hur gammal var du på ett ungefär när du fick diagnosen? ☐☐ år

16. Har du av läkare fått diagnosen depression?

☐ Nej
☐ Ja, 1 gång. Jag var då cirka ☐☐ år gammal
☐ Ja, flera gånger. Jag var vid senaste tillfället cirka ☐☐ år gammal

17. Får du *för närvarande* behandling för högt blodtryck?

☐ Nej
☐ Ja, men enbart råd om ändrad livsföring
☐ Ja, läkemedel mot högt blodtryck

18. Har du under *de senaste 12 månaderna* av en läkare eller barnmorska fått någon eller några av följande diagnoser?

		Nej	Ja
a.	Klamydia	☐	☐
b.	Gonorré	☐	☐
c.	Könsherpes	☐	☐
d.	Kondylom	☐	☐

Levnadsvanor

19. Nedan följer en lista med olika matvaror. Hur ofta brukar du äta dessa matvaror?
Svara per månad *eller* per vecka *eller* per dag.
Ha de senaste 12 månaderna i tankarna. Markera endast ett alternativ per rad.

		Gånger per månad				Gånger per vecka						Gånger per dag			
		<1*	1	2	3	1	2	3	4	5	6	1	2	3	4 el. fler
a.	Grönsaker, baljväxter, rotfrukter (färska, frysta, konserv, stuvade mm) – men ej potatis	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
b.	Frukt och bär (färska, frysta, konserv, juice mm)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
c.	Fisk, skaldjur till huvudrätt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
d.	Korv till huvudrätt	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
e.	Choklad och godis	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
f.	Bullar, kakor, kex, tårta, mm	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
g.	Ost, 24-40 % fett (ej mager ost)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
h.	Läsk/saft sötad med socker	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

** Mer sällan än 1 gång per månad eller aldrig*

20. Ange din fysiska aktivitet under *de senaste 12 månaderna.*
Nivån kan variera över året och under veckan, men försök ange ett genomsnitt.

a) Daglig sysselsättning och/eller arbete

- ☐ Mest stillasittande
- ☐ Sitter ca hälften av tiden
- ☐ Mest stående
- ☐ Går mest, lyfter, bär lite
- ☐ Går mest, lyfter, bär mycket
- ☐ Tungt kroppsarbete

b) Hem-, hushålls- och trädgårdsarbete

- ☐ Mindre än 1 timme per dag
- ☐ 1-2 timmar per dag
- ☐ 2-3 timmar per dag
- ☐ 3-4 timmar per dag
- ☐ 4-5 timmar per dag
- ☐ Mer än 5 timmar per dag

c) Sitta/titta på TV/läsa, på fritiden

- ☐ Mindre än 1 timme per dag
- ☐ 1-2 timmar per dag
- ☐ 2-3 timmar per dag
- ☐ 3-4 timmar per dag
- ☐ 4-5 timmar per dag
- ☐ 5-6 timmar per dag
- ☐ Mer än 6 timmar per dag

d) Gång/cykling

- ☐ Nästan aldrig
- ☐ Mindre än 20 minuter per dag
- ☐ 20-40 minuter per dag
- ☐ 40-60 minuter per dag
- ☐ 1-1,5 timmar per dag
- ☐ Mer än 2 timmar per dag

e) Motion
Förutom det du angivit under gång/cykling.

- ☐ Nästan aldrig
- ☐ Mindre än 1 timme per vecka
- ☐ 1-2 timmar per vecka
- ☐ 2-3 timmar per vecka
- ☐ 3-4 timmar per vecka
- ☐ 4-5 timmar per vecka
- ☐ Mer än 5 timmar per vecka

21. Har du <u>någon gång</u> rökt så gott som dagligen, under *minst 6 månader*?
Gäller cigarretter, pipa, cigarrer såväl som cigariller.

☐ Ja
☐ Nej ⟶ *Gå till fråga 26*

22. Hur gammal var du när du *började* röka dagligen?

Jag var ☐☐ år

23. Röker du <u>för närvarande</u> så gott som dagligen?

☐ Ja
☐ Nej ⟶ **Hur gammal var du när du *slutade* röka dagligen?**

Jag var ☐☐ år

24. I hur många år har du sammanlagt rökt så gott som dagligen?
Räkna inte med perioder där du haft ett längre uppehåll, dvs. 6 månader eller mer.

☐☐ år

25. Hur mycket har du som regel rökt *per dag*?
Räkna enbart den tid då du rökt så gott som dagligen.

☐☐ cigaretter, pipstopp, cigarrer och/eller cigariller per dag

26. Har du <u>någon gång</u> snusat så gott som dagligen, under *minst 6 månader*?
Gäller snus som innehåller tobak.

☐ Ja
☐ Nej ⟶ *Gå till fråga 31*

27. Hur gammal var du när du *började* snusa dagligen?

Jag var ☐☐ år

28. Snusar du <u>för närvarande</u> så gott som dagligen?

☐ Ja
☐ Nej ⟶ **Hur gammal var du när du *slutade* snusa dagligen?**

Jag var ☐☐ år

29. I hur många år sammanlagt har du snusat så gott som dagligen?
Räkna inte med perioder där du haft ett längre uppehåll, dvs. 6 månader eller mer.

☐☐ år

30. Hur mycket har du som regel snusat *per vecka*?
Räkna enbart den tid då du snusat så gott som dagligen.

☐☐ dosor per vecka

31. Har du någon gång använt hasch eller marijuana?

☐ Nej
☐ Ja, för mer än ett år sedan
☐ Ja, det senaste året
☐ Ja, den senaste månaden

32. Har du *de senaste 12 månaderna* någon gång druckit minst 1 glas sprit, starkvin, lättvin, starköl, folköl, starkcider eller alkoläsk?

☐ Nej ⟶ *Gå till fråga 35*
☐ Ja

33. **Hur ser dina alkoholvanor ut under en *normalvecka*?**
Det kan variera under året, men försök ta ett genomsnitt. Tänk först igenom dag för dag hur mycket du brukar dricka av de olika dryckerna.
Ange i tabellen vad du kommit fram till i ungefärligt antal "glas". Med ett glas menas:

4 cl sprit t ex whiskey | 5-8 cl starkvin | ca 15 cl vitt eller rött vin (1 flaska ~ 5 glas) | 33 cl starkcider el. alkoläsk | 50 cl starköl el. folköl

Illustration: AB Typoform

Exempel: Om du skulle dricka enligt följande:
En flaska folköl till lunch *måndag-torsdag*. På *tisdag* kväll ett glas starkvin. På *onsdag* kväll två burkar starköl. På *fredag* kväll tre glas vin. På *lördag* kväll ett glas vin och en drink. På *söndag* lunch en snaps och en burk starköl.

Då fyller du i tabellen på följande sätt:

	Spritdrycker	Starkvin	Vin	Starkcider el. alkoläsk	Starköl	Folköl
Måndag	0	0	0	0	0	1
Tisdag	0	1	0	0	0	1
Onsdag	0	0	0	0	2	1
Torsdag	0	0	0	0	0	1
Fredag	0	0	3	0	0	0
Lördag	1	0	1	0	0	0
Söndag	1	0	0	0	1	0

Fyll i nedanstående tabell: Fyll i alla rutor. För den/de dagar du inte druckit skall 0 (noll) anges.

	Spritdrycker	Starkvin	Vin	Starkcider el. alkoläsk	Starköl	Folköl
Måndag						
Tisdag						
Onsdag						
Torsdag						
Fredag						
Lördag						
Söndag						

34. Hur ofta under *de senaste 12 månaderna* har det hänt att du vid ett och samma tillfälle druckit alkohol motsvarande minst:
- 1 flaska vin
- **eller** 5 snapsar eller motsvarande mängd starksprit
- **eller** 4 burkar starköl
- **eller** 6 burkar folköl

☐ Nästan varje dag (minst 5 dagar per vecka)
☐ Några gånger per vecka (3-4 gånger per vecka)
☐ Någon gång per vecka (1-2 gånger per vecka)
☐ 2-3 gånger per månad
☐ 1 gång per månad
☐ 1-6 gånger per år
☐ Aldrig

35. Hur många timmar sover du vanligtvis en normal vardagsnatt?
Om du jobbar natt/skift fyller du i det genomsnittliga antalet timmar du vanligtvis sover under ett dygn. Svara i hela timmar.

☐☐ timmar

36. Hur värderar du ditt sexliv?
Vi ber dig svara på frågan oavsett om du har något sexliv eller inte.

Tycker du att det är:

☐ Mycket tillfredsställande
☐ Ganska tillfredsställande
☐ Varken tillfredsställande eller otillfredsställande
☐ Ganska otillfredsställande
☐ Mycket otillfredsställande

Psykisk hälsa och trygghet

37. **a) Har du någon gång *de senaste 12 månaderna* blivit utsatt för fysiskt våld?**

- ☐ Nej ⟶ *Gå till fråga 38*
- ☐ Ja

Om Ja:

b) Var skedde detta?

Flera alternativ kan markeras.

- ☐ På arbetsplatsen/skolan
- ☐ I hemmet
- ☐ I bostadsområdet
- ☐ På tåg, buss, tunnelbana
- ☐ På allmän plats
- ☐ På nöjesställe
- ☐ Någon annanstans

c) Vilken relation hade du till den/de som utövade våldet?

Flera alternativ kan markeras.

- ☐ Nuvarande make/maka/sambo/partner
- ☐ Tidigare make/maka/sambo/partner
- ☐ Förälder/barn
- ☐ Arbetskamrat/skolkamrat
- ☐ Annan släkting
- ☐ Annan bekant/granne
- ☐ Annan person

d) Vilket kön har den/de som utövade våldet?

Flera alternativ kan markeras.

- ☐ Man
- ☐ Kvinna
- ☐ Vet ej

38. **a) Har du någon gång *de senaste 12 månaderna* blivit utsatt för hot eller hotelser om våld som var så farliga eller allvarliga att du blev rädd?**

- ☐ Nej ⟶ *Gå till fråga 39*
- ☐ Ja

Om Ja:

b) Var skedde detta?

Flera alternativ kan markeras.

- ☐ På arbetsplatsen/skolan
- ☐ I hemmet
- ☐ I bostadsområdet
- ☐ På tåg, buss, tunnelbana
- ☐ På allmän plats
- ☐ På nöjesställe
- ☐ Någon annanstans

c) Vilken relation hade du till den/de som utövade hotet?

Flera alternativ kan markeras.

- ☐ Nuvarande make/maka/sambo/partner
- ☐ Tidigare make/maka/sambo/partner
- ☐ Förälder/barn
- ☐ Arbetskamrat/skolkamrat
- ☐ Annan släkting
- ☐ Annan bekant/granne
- ☐ Annan person

d) Vilket kön har den/de som utövade hotet?

Flera alternativ kan markeras.

- ☐ Man
- ☐ Kvinna
- ☐ Vet ej

39. **Har du *de senaste veckorna* kunnat koncentrera dig på allt du gjort?**
- ☐ Bättre än vanligt
- ☐ Som vanligt
- ☐ Sämre än vanligt
- ☐ Mycket sämre än vanligt

40. **Har du haft svårt att sova på grund av oro *de senaste veckorna*?**
- ☐ Inte alls
- ☐ Inte mer än vanligt
- ☐ Mer än vanligt
- ☐ Mycket mer än vanligt

41. **Upplever du att du har gjort nytta *de senaste veckorna*?**
- ☐ Mer än vanligt
- ☐ Som vanligt
- ☐ Mindre än vanligt
- ☐ Mycket mindre än vanligt

42. **Har du *de senaste veckorna* kunnat fatta beslut i olika frågor?**
- ☐ Bättre än vanligt
- ☐ Som vanligt
- ☐ Sämre än vanligt
- ☐ Mycket sämre än vanligt

43. **Har du ständigt känt dig spänd *de senaste veckorna*?**
- ☐ Inte alls
- ☐ Inte mer än vanligt
- ☐ Mer än vanligt
- ☐ Mycket mer än vanligt

44. **Har du *de senaste veckorna* känt att du inte kunnat klara dina problem?**
- ☐ Inte alls
- ☐ Inte mer än vanligt
- ☐ Mer än vanligt
- ☐ Mycket mer än vanligt

45. **Har du de *senaste veckorna* känt att du kunnat uppskatta det du gjort om dagarna?**
- ☐ Mer än vanligt
- ☐ Som vanligt
- ☐ Mindre än vanligt
- ☐ Mycket mindre än vanligt

46. **Har du *de senaste veckorna* kunnat ta itu med dina problem?**
- ☐ Bättre än vanligt
- ☐ Som vanligt
- ☐ Sämre än vanligt
- ☐ Mycket sämre än vanligt

47. **Har du ständigt *de senaste veckorna* känt dig olycklig och nedstämd?**
- ☐ Inte alls
- ☐ Inte mer än vanligt
- ☐ Mer än vanligt
- ☐ Mycket mer än vanligt

48. **Har du *de senaste veckorna* förlorat tron på dig själv?**
- ☐ Inte alls
- ☐ Inte mer än vanligt
- ☐ Mer än vanligt
- ☐ Mycket mer än vanligt

49. **Har du tyckt att du varit värdelös *de senaste veckorna*?**
- ☐ Inte alls
- ☐ Inte mer än vanligt
- ☐ Mer än vanligt
- ☐ Mycket mer än vanligt

50. **Har du på det hela taget känt dig någorlunda lycklig *de senaste veckorna*?**
- ☐ Mer än vanligt
- ☐ Som vanligt
- ☐ Mindre än vanligt
- ☐ Mycket mindre än vanligt

51. **Har du någon gång allvarligt övervägt att ta ditt liv, kanske till och med planerat hur du i så fall skulle göra?**
- ☐ Nej, aldrig
- ☐ Ja, för mer än ett år sedan
- ☐ Ja, under det senaste året
- ☐ Ja, under den senaste veckan

52. **Har du någon gång försökt ta ditt liv?**
- ☐ Nej, aldrig
- ☐ Ja, för mer än ett år sedan
- ☐ Ja, under det senaste året
- ☐ Ja, under den senaste veckan

Boende och boendemiljö

53. a) Bor du tillsammans med någon under större delen av veckan?

- ☐ Ja
- ☐ Nej → *Gå till fråga 54*

b) Med vem bor du tillsammans?
Flera alternativ kan markeras.

- ☐ Föräldrar/syskon
- ☐ Make/maka/sambo/partner
- ☐ Andra vuxna
- ☐ Barn → *Besvara även fråga c*

c) Hur många barn och i vilka åldrar?
Räkna med de barn som bor minst halva tiden hos dig.

- ☐☐ 0-5 år
- ☐☐ 6-12 år
- ☐☐ 13-19 år
- ☐☐ 20 år eller äldre

54. I vilken typ av bostad bor du?

- ☐ Hyresrätt
- ☐ Bostadsrätt
- ☐ Egen villa eller radhus
- ☐ Servicehus/servicelägenhet
- ☐ Inneboende/studentlägenhet
- ☐ Andrahandsboende
- ☐ Annat boende

55. Hur pass väl tycker du att följande påstående stämmer överens med den plats där du bor?

Man kan lita på de flesta människor som bor i det här bostadsområdet.

- ☐ Stämmer mycket väl
- ☐ Stämmer ganska väl
- ☐ Stämmer inte särskilt väl
- ☐ Stämmer inte alls

Familj, ekonomi och samhälle

56. Har du någon närstående som du hjälper med vardagliga sysslor, ser till eller vårdar?
Räkna inte med minderåriga barn som du bor tillsammans med.

☐ Nej
☐ Ja → *Om Ja:*
b) Hur många timmars arbete per vecka innebär detta i genomsnitt för dig?

☐☐☐ timmar per vecka

57. Har du någon eller några personer som kan ge dig ett personligt stöd för att klara av personliga problem eller kriser i ditt liv?

☐ Ja, alltid
☐ Ja, för det mesta
☐ Nej, för det mesta inte
☐ Nej, aldrig

58. Har du under *de senaste 12 månaderna* mer eller mindre regelbundet deltagit i aktiviteter tillsammans med flera andra?
Exempelvis sport, musik/teater, studiecirkel, religiös sammankomst, sångkör, syförening, politisk förening eller annan föreningsverksamhet.

☐ Ja
☐ Nej

59. Vilket förtroende har du för följande institutioner i samhället?
Markera ett alternativ på varje rad.

		Mycket stort	Ganska stort	Inte särskilt stort	Inget alls	Har ingen åsikt
a.	Sjukvården	☐	☐	☐	☐	☐
b.	Socialtjänsten	☐	☐	☐	☐	☐
c.	Polisen	☐	☐	☐	☐	☐
d.	Riksdagen	☐	☐	☐	☐	☐
e.	Regeringen	☐	☐	☐	☐	☐
f.	Politikerna i din kommun	☐	☐	☐	☐	☐

60. **Röstade du/kommer du att rösta i något av valen (riksdags-, landstings- eller kommunalvalen) 2010?**

- ☐ Ja
- ☐ Nej

61. **Har du under *de senaste 12 månaderna* haft svårigheter att klara de löpande utgifterna för mat, hyra, räkningar, m.m.?**

- ☐ Nej
- ☐ Ja, vid flera tillfällen
- ☐ Ja, vid ett tillfälle

62. **Har du under *de senaste 12 månaderna* avstått från att gå till tandläkare, sjukvården eller att ta ut läkemedel på grund av dålig ekonomi?**
Flera alternativ kan markeras.

- ☐ Nej
- ☐ Ja, avstått från att besöka tandläkare på grund av dålig ekonomi
- ☐ Ja, avstått från att besöka sjukvården på grund av dålig ekonomi
- ☐ Ja, avstått från att hämta ut läkemedel på grund av dålig ekonomi

Arbete och sysselsättning

63. **Vilken är din huvudsakliga sysselsättning *just nu*?**
Obs! Ange endast ett alternativ.

- ☐ Tillsvidareanställning
- ☐ Tidsbegränsad anställning (till exempel projektanställning, timanställning, vikariat, provanställning)
- ☐ Egen företagare
- ☐ Sjukskriven sedan mer än 30 dagar
- ☐ Förtidspensionär/innehar sjukersättning eller aktivitetsersättning
- ☐ Ålders- eller avtalspensionär
- ☐ Studerande
- ☐ Tjänstledig eller föräldraledig
- ☐ Arbetssökande eller i arbetsmarknadspolitisk åtgärd
- ☐ Hemarbetande/sköter hushållet
- ☐ Annat

64. **a) Vilket är/var ditt yrke eller dina arbetsuppgifter?**
Försök att lämna en så detaljerad yrkesbeskrivning som möjligt. Om du inte arbetar nu, ange yrke/arbetsuppgifter som du huvudsakligen hade i ditt tidigare förvärvsarbete.

Här följer några exempel: Skriv istället för assistent till exempel inköpsassistent, redovisningsassistent eller reklamassistent. Skriv istället för lärare till exempel förskollärare, lågstadielärare eller textillärare. Skriv istället för chaufför till exempel busschaufför, taxichaufför eller lastbilschaufför.

Yrke:

b) Beskriv din huvudsakliga arbetsuppgift så noggrant som möjligt:
Om du är projektledare skriv då exempelvis "ansvarig för att förbättra arbetsmiljön i äldreomsorgen", eller "ansvarig för att utveckla system för att förkorta väntetider i call-centerverksamhet".

65. **Har du varit arbetslös någon gång under *de senaste två åren*?**

☐ Nej
☐ Ja

66. **Vilken är din högsta genomförda utbildning?**
Obs! Ange endast ett alternativ.

☐ Grundskola, folkskola, realskola eller liknande
☐ 2-årig gymnasieutbildning eller fackskola
☐ 3- eller 4-årig gymnasieutbildning
☐ Universitets- eller högskoleutbildning kortare än 3 år
☐ Universitets- eller högskoleutbildning 3 år eller längre

Arbetsförhållanden och arbetsmiljö

Frågorna 67-84 handlar om arbetsförhållanden och arbetsmiljö. Gå vidare till fråga 85 om du inte har förvärvsarbetat under de senaste 12 månaderna.

67. Har du en arbetsledande befattning?

- ☐ Nej
- ☐ Ja

68. Hur många timmar i veckan förvärvsarbetar du sammanlagt?
Räkna inte med hem- och hushållsarbete.

- ☐ I genomsnitt mer än 45 timmar per vecka
- ☐ I genomsnitt 36–45 timmar per vecka
- ☐ I genomsnitt 20–35 timmar per vecka
- ☐ I genomsnitt 1–19 timmar per vecka
- ☐ Annan arbetstid

69. Har du varit sjukfrånvarande under *de senaste 12 månaderna*?
Gäller ej vård av sjukt barn.

- ☐ Nej
- ☐ Ja, en gång
- ☐ Ja, 2-4 gånger
- ☐ Ja, 5-9 gånger
- ☐ Ja, 10 gånger eller fler

70. Hur många dagar har du sammanlagt varit sjukfrånvarande under *de senaste 12 månaderna*?

- ☐ Ej varit sjukfrånvarande
- ☐ 1-7 dagar
- ☐ 8-30 dagar
- ☐ 31-90 dagar
- ☐ Mer än 90 dagar

71. Har du tillräckligt med tid för att hinna med dina arbetsuppgifter?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig

72. Förekommer motstridiga krav i ditt arbete?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig

73. Ger arbetet dig möjlighet att lära dig något nytt och att utvecklas i arbetet?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig

74. Har du frihet att bestämma vad som ska utföras i ditt arbete?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig

75. Har du frihet att bestämma hur ditt arbete ska utföras?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig

76. Känner du stöd från överordnade när du har problem i ditt arbete?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig
- ☐ Inte aktuellt

77. Känner du stöd från arbetskamrater när du har problem i ditt arbete?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig
- ☐ Inte aktuellt

78. Belönas man för ett väl utfört arbete på din arbetsplats (pengar, uppmuntran, uppskattning)?

- ☐ Ja, oftast/alltid
- ☐ Ja, ibland
- ☐ Nej, sällan
- ☐ Nej, aldrig

79. Hur bedömer du att din nuvarande arbetsförmåga är i förhållande till de fysiska krav arbetet ställer?

- ☐ Mycket god
- ☐ Ganska god
- ☐ Någorlunda
- ☐ Ganska dålig
- ☐ Mycket dålig

80. Hur bedömer du att din nuvarande arbetsförmåga är i förhållande till de mentala och psykiska krav arbetet ställer?

- ☐ Mycket god
- ☐ Ganska god
- ☐ Någorlunda
- ☐ Ganska dålig
- ☐ Mycket dålig

81. Med tanke på din hälsa – tror du att du kan arbeta i ditt nuvarande yrke även *om 2 år*?

- ☐ Nej, knappast
- ☐ Kanske
- ☐ Ja, troligtvis

82. Använder du i ditt arbete vibrerande, handhållna maskiner eller redskap (till exempel slipmaskin, borrmaskin, mutterdragare, motorsåg eller bilningsmaskin)?

- ☐ Aldrig eller nästan inte alls
- ☐ Cirka 4 timmar per vecka
- ☐ Cirka 10 timmar per vecka
- ☐ Minst halva arbetstiden

83. Utsätts du i ditt arbete för vibrationer eller stötar som får hela kroppen att skaka eller vibrera (till exempel vid arbete som förare av arbetsmaskiner, vissa lastbilar eller bussar eller vid arbete på vibrerande golv)?

- ☐ Aldrig eller nästan inte alls
- ☐ Cirka 4 timmar per vecka
- ☐ Cirka 10 timmar per vecka
- ☐ Minst halva arbetstiden

84. Kommer dina händer genom ditt arbete i kontakt med vatten?
Räkna inte med den tid då du skyddar händerna med handskar.

- ☐ Nej, inte alls
- ☐ Mindre än ½ timme per dag
- ☐ ½ -2 timmar per dag
- ☐ Mer än 2 timmar, men mindre än 5 timmar per dag
- ☐ 5 timmar per dag eller mer

Bakgrund

85. **Vilket år är du född?**

1	9		

86. **Är du man eller kvinna?**

- ☐ Man
- ☐ Kvinna

87. **Hur definierar du din sexuella läggning?**

- ☐ Heterosexuell
- ☐ Homosexuell
- ☐ Bisexuell
- ☐ Osäker på min sexuella läggning

Tack för att du tog dig tid att fylla i enkäten!

Posta den i det bifogade svarskuvertet så snart som möjligt.